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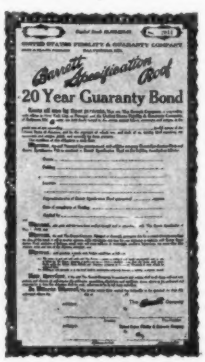

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GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View in ROSS WAY *Looking East.*

H. M. Office of Works,
Westminster,
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JOURNAL OF THE
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Vol. V SEPTEMBER, 1917 No. 9

Shadows and Straws

The War—The Machine—The Man!

THE SIGNIFICANT THING about the vast governmental housing undertakings of Great Britain, of which Well Hall, one of the most important, is illustrated in this number of the Journal of the American Institute of Architects, does not lie in either the technique of the operation or the result. The significance lies in the fact that War has given a prominence to housing such as Peace could not give. War has made us see that the philosophy of housing—call it the science if you will—as applied on so vast a scale by Germany, was really inspired by her profound analysis of what would be necessary first to prepare for war, and second to conduct a war. Germany foresaw what England had to learn—that a modern army is dependent upon the industries at home; that War demands more from industry than does Peace; that the meeting of those demands which mean national life or death depends upon obtaining the utmost in skill and energy from the workers who supply the soldiers; that workmen cannot put forth those qualities except under living conditions which constantly renew and thus maintain the highest vitality. Peace has enunciated this economic principle with a voice which has been drowned to a whisper. War shrieks the message to the nation and makes it heard above all other cries, and England has heard so well that in addition to the extraordinary plans which have already been executed—under financial and industrial pressure which only add to their extraordinary character—she is looking far ahead into the future and making ready to provide new living conditions to replace the old. She is now far-seeing enough to understand that the essential principle of her national existence cannot be left to the speculative builder.

Independently and in spite of the emergency housing which already has been undertaken by industrial corporations and by private capital, the industrial housing situation in the United States is at this moment a vital and yet scarcely recognized factor in our war-time industrial production, upon which all other things depend. A most casual examination of the facts will bring one face to face with the knowledge that unless the Government will cope with the problem of housing workmen as it is meeting the problems of housing machinery, we shall shortly be at an impasse. It is useless to encourage industry to expand while leaving the housing of workmen to chance and caprice.

At Bridgeport, Connecticut, for example, a new factory for war purposes is being rushed to completion. It will employ a thousand operatives. There is at present, as we are informed, not a single house available for rent in Bridgeport, nor is there any capital available for building. The Government is, we are told, furnishing money for the new building to contain the machinery while the housing problem is totally ignored! Could anything be more shortsighted? This is one situation in many, and fresh ones are developing with every step which the Government is taking toward speeding up production. Our ability to build ships is found to be based upon first housing the workmen. In almost every industrial center, large or small, the cry is for houses and more houses. The private capital usually available for operations of this kind is being diverted to other uses where the gains promise to be large. The very war-time hazard

attending upon many of these demands for more houses deters capital, while the present cost of building also adds an element of uncertainty as to the future of the investment. It is by no means certain that rentals based upon present building costs will continue to be payable by workmen, and there are doubts, in many cases, as to the permanent nature of the industries for which houses are needed.

The situation has developed with amazing rapidity and will soon reach a climax that cannot be ignored. It seems that it might have been possible to foresee this by making a simple study of the human element involved, but the problem is now here and has assumed menacing proportions. Upon the speed and thoroughness with which it is met will depend our ability to supply the equipment without which we cannot successfully perform our share in France. There seems to be no other agency capable of quickly assuming the direction and control of the problem than that of the National Government.

This was the step which England found it necessary to take, and in that country the need was met with the same degree of energy and ability which has characterized the remarkable industrial transformation which the war has forced her to undertake. More than that, she was wise enough not to try to meet the situation by temporary makeshifts but by building permanent houses which are to remain as a national asset, or else by building, as she did in some localities, other buildings such as hospitals, which later easily can be converted into substantial modern houses at low rentals. She met the problem squarely and with economic astuteness.

For the United States Government to extend financial aid to home building, in whichever one of the forms that have been put into operation in every other civilized country, would be more of a jump than a step. We are inexperienced in dealing with the question, whereas European countries without exception have all extended financial aid to the building of homes for workmen. But it would be as absurd to argue over the principle involved, at this moment, as for an engineer to hesitate at cutting down an apple orchard in order to build a bridge to save a division of troops. War is relentless. It asks plain questions and insists on getting the answer. The answer to this war is industrial organization. The answer to that is homes for workmen to live in. The answer to that is to build them now and cut off the delay and waste involved by waiting for somebody else to do it. When we are spending at the rate of $50,000,000 a day, delays cost money!

As to the method by which the Government should extend aid it seems evident from the facts now available that private capital only needs to be supplemented to the extent of relieving it of the risk consequent upon the uncertain nature of those undertakings where permanency is involved. To meet this same condition in the expansion of industrial plants and not to meet it by absolutely assuring the necessary house building is to refuse to recognize an elementary business principle. The methods of extending governmental aid by the principal countries of the world are set forth in the volume published by the Department of Labor in 1915 and are familiar to those who have studied the housing question in European countries.

The Government is already at work in a preliminary consideration of plans for coping with the housing shortage at some of the vital points, and it seems not unlikely that the building of Government-owned workmen's houses may begin in the near future. On account of the shortage of capital, several large industrial housing schemes which had been started have now come to a stop.

In Washington, the congestion has now so hampered the administrative functions of the Government that Congressman Fitzgerald, of New York, has advocated the erection of a three-story temporary office building, of frame construction, with a ground-area of 350,000 square feet, and designed to provide space for 10,000 employees. It is planned to erect this building on the Mall, not far from the Capitol, and while the site selected seems less desirable than others which might have been found, this plan would undoubtedly prevent the further mulcting by owners of buildings, who are now collecting no less than a million dollars yearly from the Government. Yet one hesitates to think of what might happen in the event of a fire in such a structure. Temporary buildings are undoubtedly the answer to the immediate needs, but they must be made safe to life, at no matter what expense.

The Organization of the War Department for Construction Work*

(Furnished by the Government Committee on Public Information)

Office of the Cantonment Construction Division of the Quartermaster's Department

All work pertaining to the thirty-two cantonments for housing the National Guard and National Army, also embarkation depots, warehouses, etc., is handled by Colonel Littell through the organization which has just been set up for that purpose, with Captain Marshall as his Adjutant.

In order to carry out the work, the duties and responsibilities of the several divisions are defined as follows:

Engineering Division.

The officer in charge of the Engineering Division prepared the typical plans of cantonments, including water distribution, internal sewer and draining lines, lighting distribution, trucks, roads, etc. He secured, with Colonel Littell's approval in each case, the services of consulting engineers to do all the engineering involved in water-supply and sewage-disposal, as this is work which must be done in the field.

Designs prepared for such works are submitted, through Colonel Littell, to the consulting engineers of the Committee on Emergency Construction for approval or comment.

He determines and defines the requirements in the way of laundries, incinerators, refrigerating plants, and informs the Material Officer of the requirements, including any other information that he gets incidental to these investigations, and he and the Material Officer together discuss and recommend to Colonel Littell where these contracts and other similar contracts should be placed, the details of the purchasing being in the hands of the Material Officer.

Material Division.

The officer in charge of the Material Division makes recommendations as to placing all contracts for material to be purchased by this organization. He consults freely with the Engineering Office and with Colonel Littell in connection with the purchase of such equipment as power plants, pumping machinery, refrigerating plants, and similar items, and with the Constructing Officer on building materials and supplies.

He keeps in touch with the various supply committees of the National Munitions Board and works out with those committees the best method of handling supplies of material which they may control.

He also has charge of the inspection and expediting of materials and equipment, excepting such part of this work as may be turned over to the several contractors, and even in these cases is ready at all times to help the contractors in any way possible to secure the necessary materials.

The details of transportation from points of manufacture to the several cantonments are handled by the several contractors, but transportation requirements are worked out in advance and arrangements made with the railroad association and with the Transportation Committee of the Munitions Board so that cars are available and transportation expedited in every way possible.

Construction Division.

The officer in charge of the Construction Division is in charge of all operations in the field and handles the correspondence, directly or through his representatives, on all questions arising between the office and the contractors, or between the office and constructing quartermasters stationed at the several cantonments.

The officer in charge selects assistants, each one to follow in detail the work located in the several cantonments as assigned.

Any correspondence originating in any part of the office other than the Construction Division is signed by the officer originating the correspondence but goes out over the desk of one of these assistant construction officers, so that they can be familiar with all matters under discussion.

In the same way all correspondence coming in from constructing quartermasters, referring to engineering, material, or accounting matters, comes in over the desk of the proper assistant construction officer, to be noted and forwarded to the officer in charge of the department having jurisdiction.

In addition to the assistant construction officer located in this office and mentioned above, there are other assistant construction officers similarly assigned who act as field supervisors and circulate, each in his own territory, practically all the time, reporting to this office after each visit to a job.

Accounting Division.

The officer in charge supervises accounting matters and the general administration of the office.

Under his direction an accountant is chosen who handles the accounts of this office and supervises the work of the accountants stationed at the various cantonments, and also of the auditors. Each of these auditors covers a territory corresponding to the territory covered by one of the assistant construction officers and visits the jobs in his territory often enough to be sure that office routine and accounting matters are being handled satisfactorily.

*Referred to in Structural Service Department of August Journal.

The officer assigned to duty in this Division for legal matters advises with all divisions of the office at any and all times, and every precaution is taken to comply with laws and regulations, with particular reference to matters involving expenditure of funds.

Constructing Quartermaster's Office.

Each Constructing Quartermaster reports to the office through one of the assistant construction officers outlined above. He has an assistant who is a civil engineer, and there is under him whatever force of surveyors, draftsmen, auditors, etc., is needed by particular circumstances.

The Constructing Quartermaster has the responsibility of adapting to the topographical conditions typical plans furnished by the office.

As outlined above, he has the assistance of civilian engineers in the planning of water-supply, sewage-disposal, etc. The contractor does such engineering work as is necessary to carry out the plans.

The conditions in various cantonments differ, and matters of this kind are left largely to the judgment of the Constructing Quartermaster to be decided for each cantonment on its own merits, after consulting with the office.

The theory of the field organization is to use the contractors' organization as far as possible for the field work required and for any engineering details.

The chief accountant is responsible for the administration of the job office of accounting, for all expenditures of the contracting officer direct, and for verifying and auditing the expenditures of the contractor, and payments to the contractor by the Constructing Quartermasters are made practically on the certificate of the chief accountant.

The office issues instructions for the chief accountant, who is a part of the Constructing Quartermasters' organization.

The number of clerks, stenographers, and inspectors, varies, of course, at the different jobs, depending on local conditions.

Assignments.

The following assignments in charge of divisions have been made:

Material Division, Major R. E. Hamilton.
Engineering Division, Major F. M. Gunby.
Construction Division, Major M. J. Whitson.
Accounting Division, Major W. A. Dempsey.

Office of the Signal Corps Construction Division

Chief, Construction Division: CAPTAIN C. GOODLOE EDGAR, S.C.U.S.R.

Administration Division.

The duties of the Construction Division of the Signal Corps cover all activities relating to the design and construction of signal corps and aviation buildings, and maintenance and repair of all buildings, both temporary and permanent. It has charge of the railroad transportation of supplies, material, and personnel of the corps.

The work of the Division, under the direction of its chief, is divided into departments, each in charge of an officer detailed from the Signal Corps, with the single exception of the Engineering Division which is in charge of an officer detailed from the corps of engineers, U. S. Army, and the real estate division in charge of a trained real estate operator on a civil status.

(*a*) Administration.—This division has general supervision of all correspondence, organization, office methods, annual estimates, and coördination of division work, etc., and is in charge of an assistant chief, or acting chief in his absence.

(*b*) Transportation.—This division has charge of the movement of all supplies, material, and personnel of the corps.

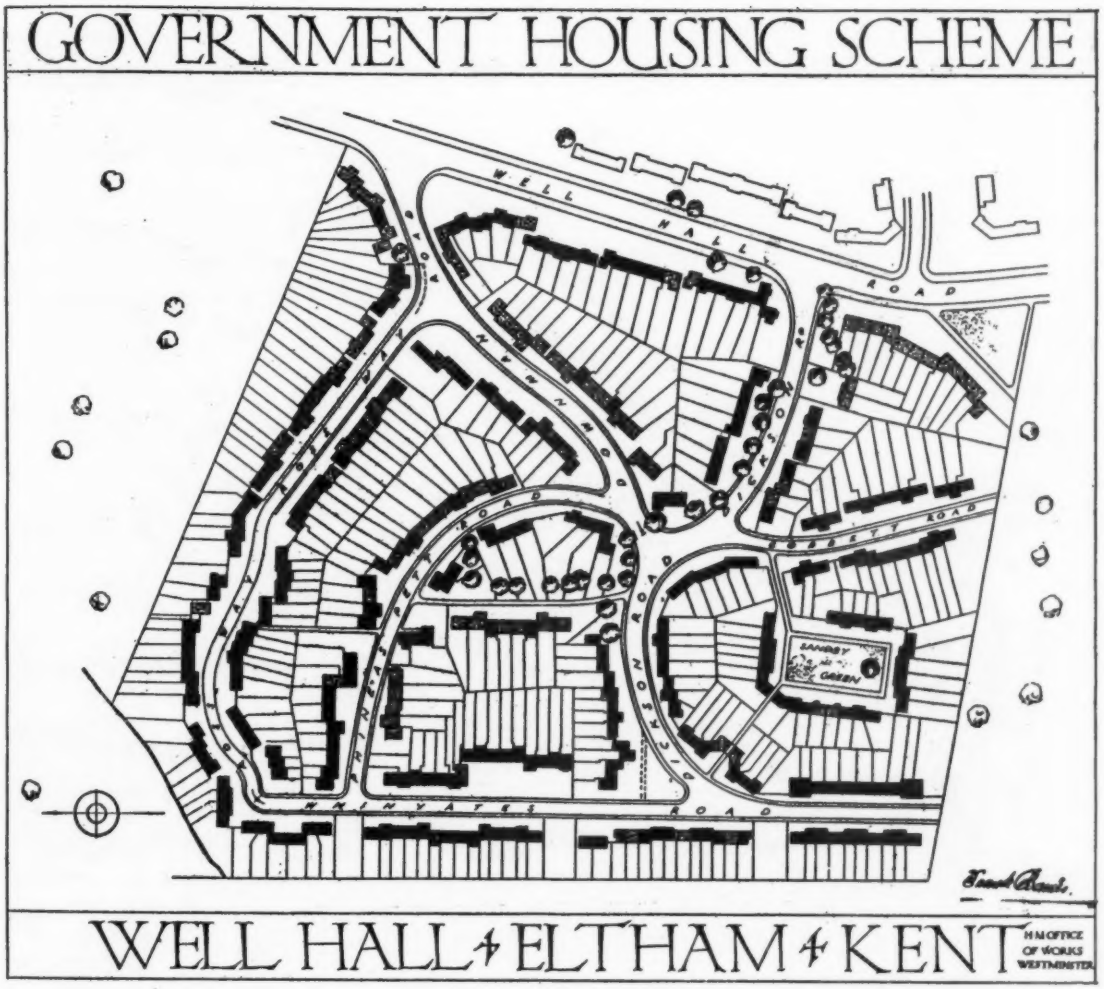
(*c*) Records and Audits.—This division operates two subdivisions, one having charge of records and audits at its offices in Washington, two in charge of records and audits in the field.

(*d*) Engineering.—This division operates through two subdivisions. One is located in Washington in general charge of engineering problems, plans, specifications, prices, and inspections. It arranges for the purchase of material and supplies for building operations. The second superintends building operations and engineering problems in the field, inspects material as delivered, and adjusts wages and labor disputes.

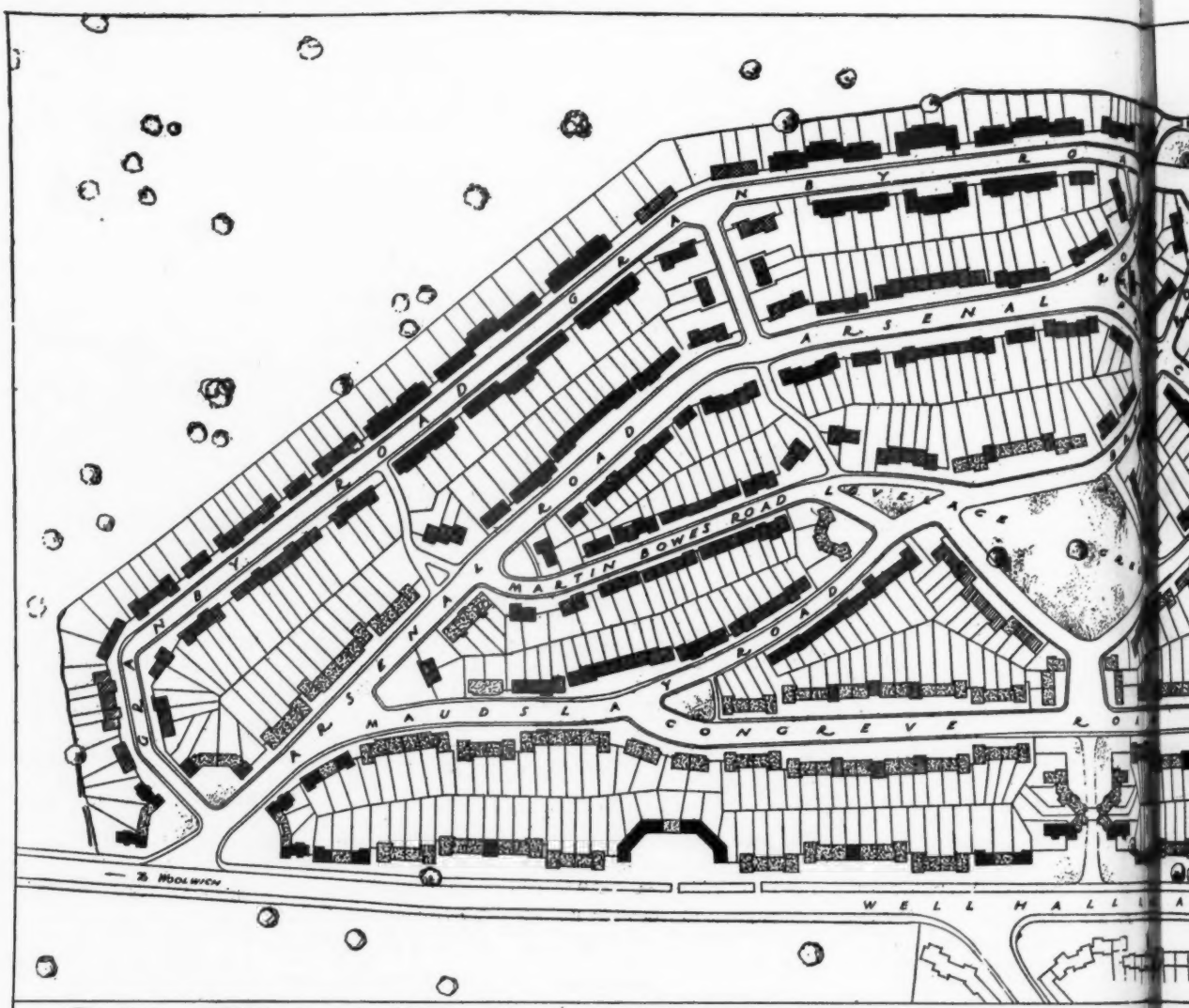
(*e*) Real Estate.—This division has charge of the inspection of proposed aviation training-fields, the inspection of other proposed sites for signal corps buildings, preparing and renewal of leases, examination of titles, and it is charged with notification to the Finance Division of dates of payments on leases in advance of their maturity.

(*f*) General.—An advistory architect has been retained who furnishes the Division with plans and specifications for the buildings used for aviation, both temporary and permanent, and whose opinion is secured on all material and supplies.

The work of the Division, as will be seen from the above, is divided into work in Washington and work in the field. At each building operation an officer in charge is furnished by the Engineering Department with assistants who are trained by means of daily meetings at the work to complete familiarity with standard plans, specifications, and design of buildings for the Signal Corps. A chief auditor and sufficient assistants are furnished at each building operation to supervise the books of the contractor, to check pay-rolls and material bills, to prepare for him the vouchers and papers necessary to be furnished to the Finance Division in Washington before payments can be made. In addition, inspections are regularly made by officers from the headquarters of the division in Washington during the course of the work.



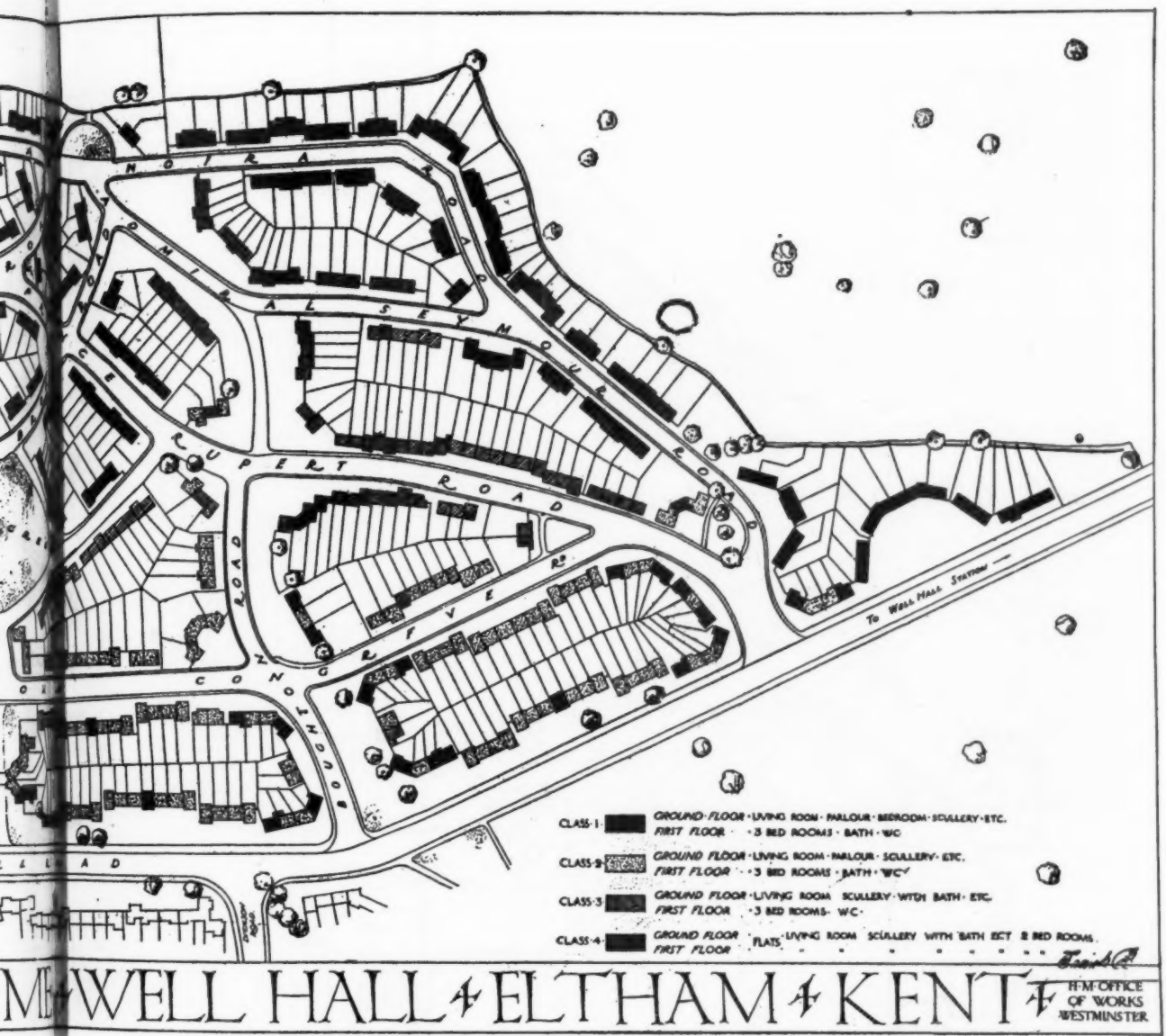
WELL HALL is only one of the British Government's housing operations. It is situated about a mile from Woolwich and is a complete new development. It consists entirely of permanent dwellings for workmen. There are four types of houses of from two to four rooms with bath, the rentals ranging from seven shillings to fifteen shillings and sixpence a week. There have been built some sixteen hundred houses, all of the best materials available, and the design has preserved the traditions of English rural life. Mr. Ewart G. Culpin, Secretary of the International Garden Cities and Town Planning Association, whose article in the April Journal dealt with the application of town-planning principles to the new housing developments of England, writes that he believes Well Hall to be "easily the first thing in cottage plans and elevations for the whole world." This statement is perhaps capable of a wrong interpretation, for it is evident that the plans would not suit living conditions in the United States; but, from the point of view of a great housing undertaking deliberately undertaken by a Government and guided by experts to yield the maximum advantages consistent



GOVERNMENT HOUSING SCHEME

with a given mode of life, Well Hall is undoubtedly entitled to rank where Mr. Culpin places it.

Of primary importance in the consideration of the underlying reasons which led to the building of Well Hall is the fact that in spite of urgent necessity it was decided to make it a permanent enterprise rather than a merely temporary one. This has been the consistent policy of the British Government, except where urgence made it impossible to wait upon permanent construction, for the difference in cost between permanent and temporary work is measured by a small margin, and it was decided that it would be folly to throw away money upon makeshift expedients. Possibly this decision was also influenced by the knowledge that nothing is harder to be rid of than a temporary building. We believe that the shacks built at the time of the flood emergency in Galveston


NORAH ROAD
ADMIRAL SEYMOUR ROAD
RUPERT ROAD
GROVE Rd
CONNAUGHT ROAD
To Well Hall Station
CLASS 1 GROUND FLOOR · LIVING ROOM · PARLOUR · BEDROOM · SCULLERY · ETC. FIRST FLOOR · 3 BED ROOMS · BATH · WC
CLASS 2 GROUND FLOOR · LIVING ROOM · PARLOUR · SCULLERY · ETC. FIRST FLOOR · 3 BED ROOMS · BATH · WC
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WELL HALL · ELTHAM · KENT
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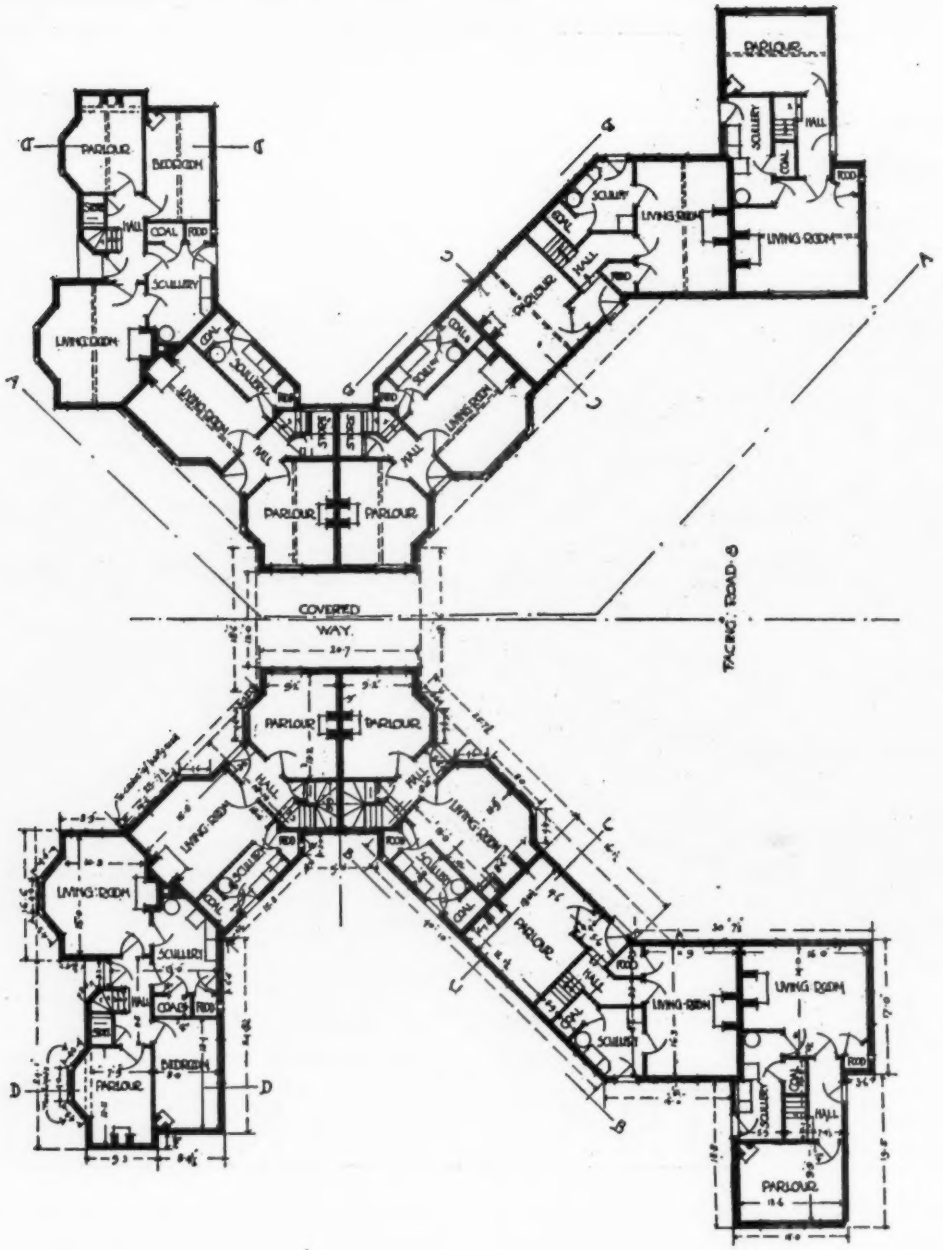
are still doing duty as slums, and such is the usual experience with temporary buildings. In cases where the British Government could not spare the time necessary to build permanently, huts of a temporary or semi-temporary character were constructed, either of concrete slabs or wooden framing. These were three in type and, as built at East Riggs, another important housing development, will be illustrated and described in the October Journal, which will also contain a list of references on Industrial Housing.

In addition to these purely housing operations, the Government has erected stores, halls, and other public buildings necessary for a good-sized town; in one case there were provided bakeries, a central kitchen, laundry, schools, churches, and all the usual accessories of community life.



Ground Floor Plan.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
Group facing WELL HALL *and* CONGREVE ROADS, *1st and 2nd Class.*

H. M. Office of Works
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
Entrance Group in WELL HALL ROAD, *East Side.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View in WELL HALL ROAD *Looking South.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
A Group in WELL HALL ROAD *Looking South.*

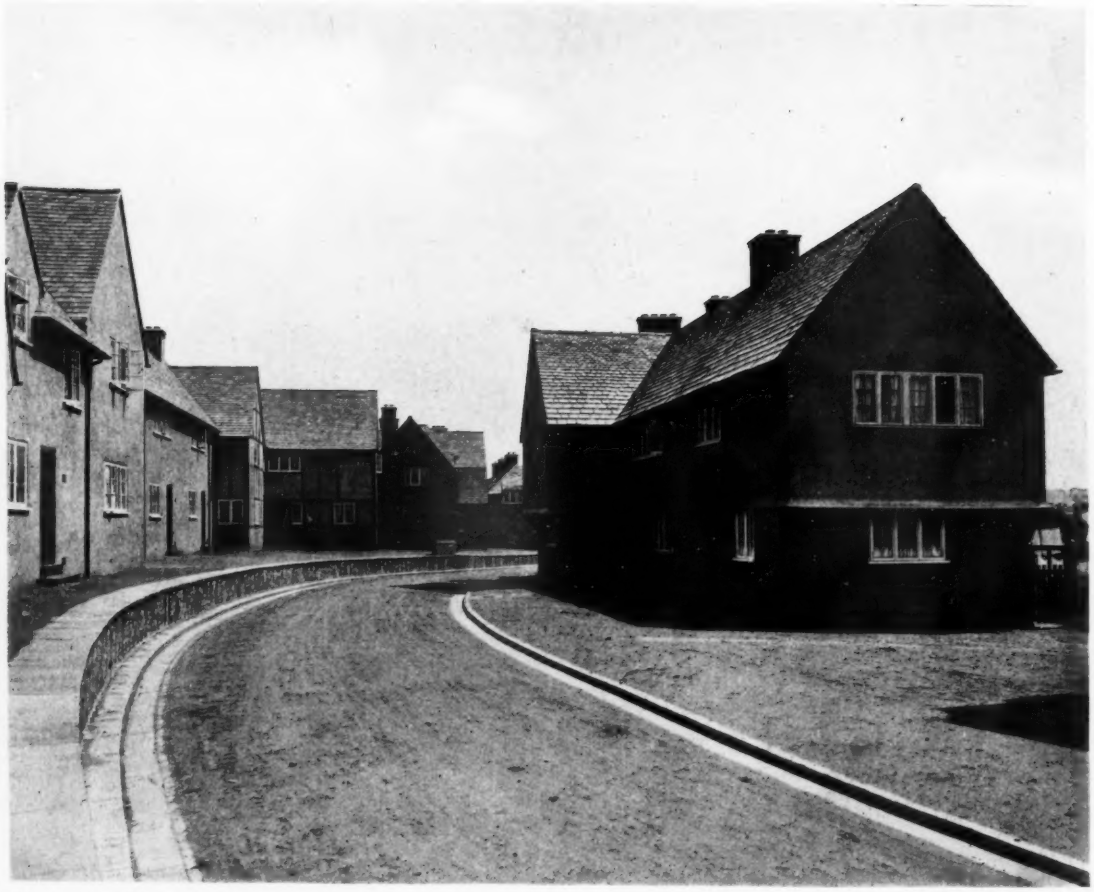
H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View in WELL HALL ROAD *Looking North.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.¹
Crescent near Station in WELL HALL ROAD.

H. M. Office of Works,
Westminster,
London, S. W.



GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View in ROSS WAY *Looking East.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View in ROSS WAY *Looking West.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
WHINYATES ROAD *from* ROSS WAY *Looking South.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
A Group in WHINYATES ROAD *Looking North.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
Block of Houses in PHINEAS PETT ROAD.

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
SANDBY GREEN *Looking North.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
LOVELACE GREEN *Looking North.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
Pair of Cottages in LOVELACE GREEN.

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View in ARSENAL ROAD *Looking South.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
CONGREVE ROAD (*Boughton Road Crossing*) *Looking South.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
Junction of CONGREVE ROAD *and* MAUDSLAY ROAD *Looking North.*

H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View in CONGREVE ROAD *Looking North.*

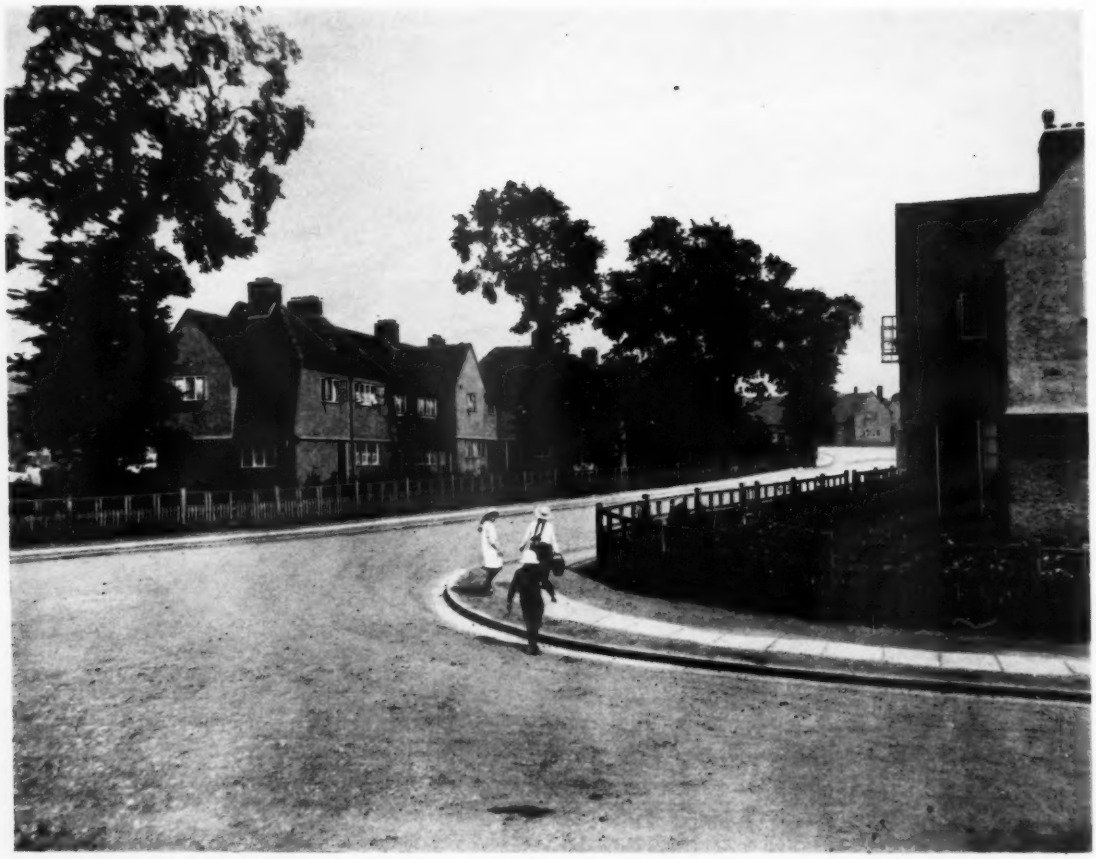
H. M. Office of Works,
Westminster,
London, S. W.

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
Group of Houses in DOWNMAN ROAD.

H. M. Office of Works,
Westminster,
London, S. W.

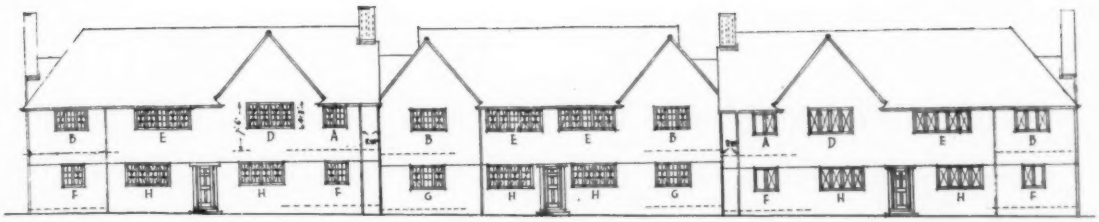
GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View of GILBORNE WAY *Looking West.*

H. M. Office of Works,
Westminster,
London, S. W.



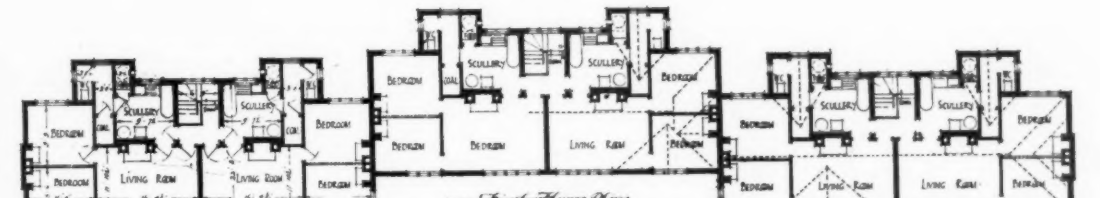
GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH. 1915.
View in DICKSON ROAD *Looking East.*

H. M. Office of Works,
Westminster,
London, S. W.

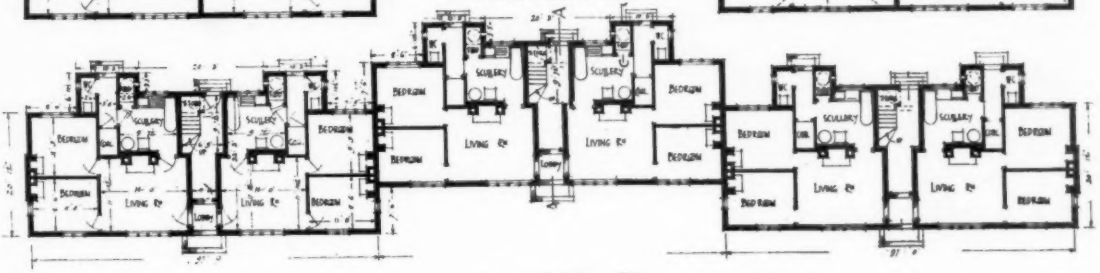


Front Elevation

Back Elevation



First Floor Plan



Ground Floor Plan

GOVERNMENT HOUSING SCHEME,
WELL HALL, WOOLWICH 1915.
Block of Flats, GRANBY ROAD, *Class IV.*

H. M. Office of Works,
Westminster,
London, S. W.

Multi-Family *versus* Individual Houses

By HENRY ATTERBURY SMITH

NEARLY all our cities are built upon unscientific exploiting systems, a good deal as we encourage the sale of liquor to gather a tax, and then have all sorts of reformatories and asylums to care for the victims.

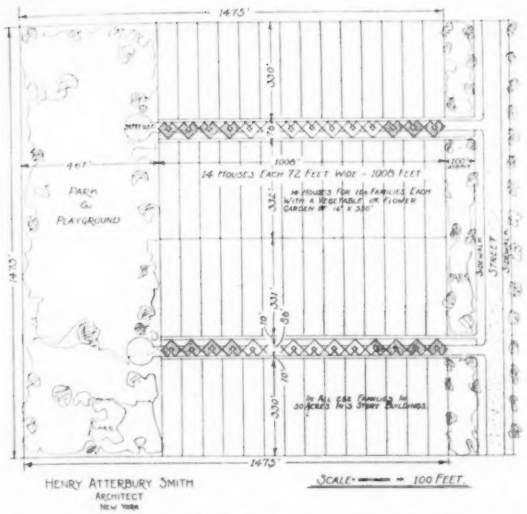
Most buildings that house the masses are built to sell, and so they are built shoddily and only as good as they must be in direct proportion to the building laws and municipal supervision. The idea of building real well never enters the head of the building promoter, who may not be a builder at all. In fact, usually he is a storekeeper or trader who sees far more profit in selling a building than he does in selling clothes or suspenders, because the amount involved is larger and the purchaser is more ignorant. He is usually in league with a loan man or institution, which latter, I am sorry to say, is frequently a savings bank. But usually the loan is sold as soon as the building, and so the two original partners step out immediately and turn the project over to two other innocent people, who try from then on to squeeze an income out of a rotten machine which gets worse and worse rapidly until a few years after, health boards order the premises vacated.

New York, proud New York, the self-appointed example to the rest of the states, not only allows but recommends this miserable type illustrated below.

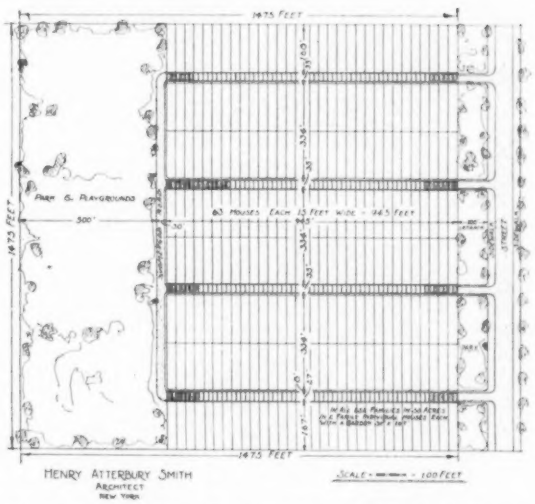
What are we architects to say about such a thing; calmly let it pass, or protest? If we cannot suggest something better, we are grossly incompetent or indifferent.

Now, again, how about all this stuff about the individual house for the employee in the industrial town? Have you ever seen the result, reader; have you ever pushed down to the fundamentals of this talk; have you ever studied the balance-sheet to see if the truth is being stated? Are you sure the lowest paid in the factory are being housed at all or are they boarding, rooming, or crowding? If not, they soon will be. How can the lowest incomes afford to sustain those individual public utilities which our knowledge of health demands? In cold climates how can each family shovel coal, or in warm, have enough energy left after a day's work to look after plumbing, shutters, gutters, and leaders? Why should we foist all this work and repairs upon the individual occupant—the stitch in time to save nine—when he or she or both have had a hard day's work in the mill or factory or mine, and who are supposed to have a family of children besides?. The answer is to be found in the word exploitation at times, for it has been soberly brought to the writer's attention that a long-time obligation, like a fifteen-year mortgage upon the workman's cottage, has a tendency to keep the operative in the factory organization. He is less likely to strike or leave if he has paid something on his house. When it is not wilful exploiting then it is gross ignorance and lack of imagination or sympathy, for how can the general run of house occupants know how to take care of their real estate in such a manner as will cause it to last and not become a source of expense? Even the most intelligent of us seem not to understand how to make a house hold out year after year. No, the answer is a multi-family house, with expert repair men constantly on the job, men who like such work, just as

A Bad Type That Gives a Bad Name to the Multi-Family House, Built by the Mile This Year in Greater New York



Sawtooth Economic Open Stair Type, Three Families to a Floor, Three Stories High, Nine Families to a House or Staircase. 252 Families in All, in 50 Acres



Linear Streetless Type, Exact Duplicate of Philadelphia Terrace, 4 Rooms and Bath, House 27′ by 15′ Broad. 252 Families in All, in 50 Acres

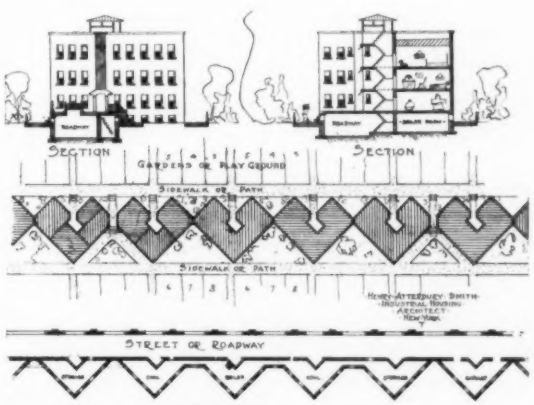
EACH OF THESE HOUSES HAS THE SAME NUMBER OF FAMILIES, EACH FAMILY HAVING FOUR ROOMS AND A BATH. CONDUCIVE TO ECONOMICAL STEAM HEATING AND APPLICATION OF OTHER PUBLIC UTILITIES

other men, like myself, hate it—one man a tinsmith and plumber, another a painter, another man to take away the garbage, say twice a day, and burn it in an incinerator to produce hot water. We shall also want women to collect the rent and coöperate with the families in regard to their varying necessities.

Then we get as true efficiency in the life of the factory families outside the factory as we do inside, and the occupants can buy the stock of the housing company and be represented upon the board of directors or they can in time be the sole managers.

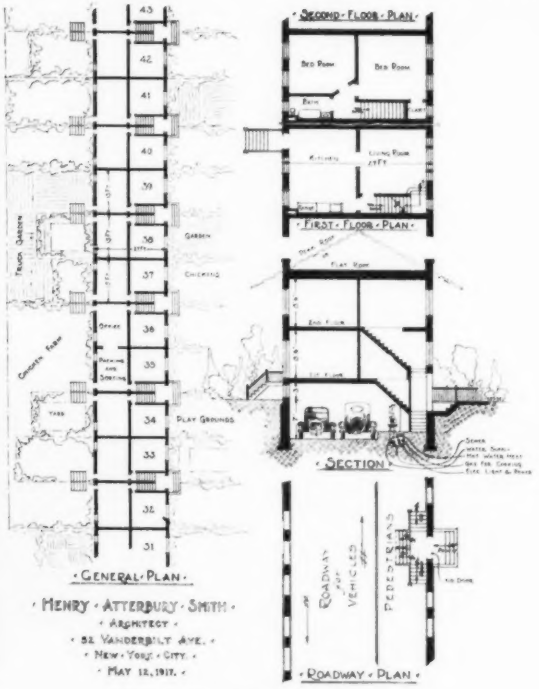
The multi-family house is thought to bring about congestion, but it is a very idle, immature thought that jumps to such a conclusion. Property restrictions are usually in vogue in some form or other, even with an individual house scheme. It is quite feasible, without a strain on one's mentality, to imagine that a similar restriction could be made regarding a multi-family house scheme.

Let us limit the number of families per acre, and let us induce some kinds of families on some acres and other kinds on others, according to the type and finish of the buildings, or the



PERSPECTIVE AND DETAILS OF SAWTOOTH ECONOMIC OPEN STAIR TY. 2

NON-COMMUNICATING ECONOMIC OPEN STAIRS, WEATHER PROTECTED. INTERCOMMUNICATION, INFECTION AND CONTAGION REDUCED TO A MINIMUM



DETAIL PLANS AND SECTION LINEAR STREETLESS TYPE

character of the probable occupant. What shall that limit be? It will vary, no doubt, according to conditions, but let us assume that it is to be five families to the acre, a very roomy layout (8,712 square feet to a family, 100 x 87), provided we don't waste a lot of the ground in streets and pavements (for the convenience of the tradesman), the maintenance of which becomes a heavy tax upon our resources, and the danger of which to our children is proverbial. Let's away with the street entirely; it may be of great interest to the engineer—curbs, sidewalks, grades, fills and cuts, sewer and water out under the roadway in an inconvenient place to connect and repair—but to an architect the roadway is a means to an end, and one of very doubtful value.

Let us study a layout of a square plot of, say 50 acres, and I will leave the solution of that plot to anybody else who wants to submit in a following article how he would improve matters by covering the property with an identical number of individual homes, or semi-detached, or triple or quadruple, or any other kind of a make-shift, including the world-renowned terrace type that makes Philadelphia and Baltimore famous. I submit two types: both multi-family, coöperative types; both having their heating, sewage, domestic hot water, lighting, power (for sewing and other light machines) provided from central plants; both having repairs done by experts who do nothing else; both assuring rent is paid just as taxes; and both giving the occupant every opportunity to become an owner of the stock with a voice in the management.

The two types I suggest are the "sawtooth economic open stair" type and the linear type suggested by Mr. Stephen Lengyel and Mr. Edgar Chambless, respectively. In certain cases, one type will be preferable to the other, depending on the contour and shape of the property and other conditions such as proximity to the central plant. In the sawtooth type the heating plants can economically be distributed, one to each 75, 100, or 125 families, and can be contained right in the basement. In the linear type the heating plant and sewage system are a little more difficult, but other considerations keep the comparison very close.

The New License or Registration Law for Architects Now in Force in the State of Illinois

It Abolishes the Old Board of Examiners and Its Officers, and Puts the Enforcement of the Law into the Hands of a Director of Registration and Education, Who is Not an Architect, and Has the Same Authority over Twenty Other Departments Comprising the Department of Registration and Education; in the Performance of Which Function he is Assisted by Committees of Architects Nominated by the Regular Organizations of Architects within the State

By PETER B. WIGHT, F.A.I.A.
Seventeen Years Secretary of the Illinois State Board of Examiners of Architects

The examination and licensing of architects in the State of Illinois and the regulation of the practice of architecture as a profession is no longer the legal prerogative of a Board of Examiners consisting of five architects in that State. It is now the duty of *The Department of Registration and Education* organized on the 1st day of July, 1917, under "An Act" passed by the present General Assembly "*in relation to the civil administration of the State government, and to repeal certain acts named therein.*"

This does not mean that there is any diminution of the effectiveness of the original Architects' License Law, with the various amendments which from time to time have been adopted to facilitate its better enforcement, but that the licensing of architects and regulation of the practice of architecture as a profession are to proceed from a higher authority than heretofore; one which should be more highly respected by the architects and the community than has been the case, and which is intended, if possible, to remove it from the taint of party politics, which formerly was possible.

Illinois a Pioneer State

The State of Illinois, as in much other progressive legislation, has been the pioneer in the United States in legislation for good architecture. The first license law was passed June 3, 1897, and had been in force since July 1 of that year, just twenty years, until the new *Civil Administration Code* be camein force July 1, 1917. This code is far-reaching in its effect. It has been agitated just four years, and in the form in which it was adopted has been under consideration for one year last past. It was first prepared by a commission appointed by the General Assembly of 1915, and it was the principal measure advocated by Governor Frank O. Lowden, in his canvass before the people, which resulted in his election in 1916 by a large majority of the popular vote. It was introduced early in the session of 1917, and took precedence of all other legislation. Governor Lowden took personal interest in it and followed minutely every stage of the proceedings in the General Assembly. The interests of architects in the regulation of their profession, of structural engineers in theirs, and in public works and buildings by both, were of minor consequence in comparison with those of the State's Charities, Finance, Agriculture, Mines, Public Health, Trade and Commerce and many other departments. Yet they have received careful attention, and the Governor called upon the organized associations of both architects and engineers to consult with him about the provisions of the act which were of interest to them, and has accepted all that were reasonable. Hence the influence of both professions was exerted in behalf of its passage.

The "Consolidation" Bill

The whole scheme was so great and comprehensive that it was evident to all that it was useless for any to seek any special favors. It was known as the "Consolidation" bill, and its main purpose was to eliminate overlapping authority and to bring together co-related departments of the government and all of them more directly into contact with the supreme executive authority which is vested by the Constitution in the Governor himself. A governor who was not afraid to assume it was at the head of the movement. It may be of interest to know that, in this consolidation, twenty-four acts and parts of acts establishing governmental departments were repealed in this bill; but the Architects' License Law was not repealed. Only the State Board and officers under the Board were abolished and their authority vested in the director of one of the departments. But this Director of the Department of Registration and Education also has official authority over the business heretofore done by twenty other state boards and minor departments; and he is only one of nine department heads, who constitute the Cabinet of the Governor; and all are responsible to him.

A Sketch of the New Law

A few extracts from the new law covering anything directly or indirectly relating to architects will probably make this digest more brief than a general description of its requirements. The same might also be said of those relating to structural engineering.

"*Section 3.* Departments of the State government are created as follows: (1) Finance; (2) Agriculture; (3) Labor; (4) Mines and Minerals; (5) Public Works and Buildings [this includes the office of the State Architect]; (6) Public Welfare; (7) Public Health; (8) Trade and Commerce; (9) Registration and Education [this includes the registration of structural engineers as well as architects, each under its own Act].

"*Section 4.* Each department shall have an officer at its head who shall be known as a Director, and who shall, subject to the provision of this Act, execute the powers and discharge the duties vested by law in his respective department.

"The following offices are hereby created.....

"Director of Registration and Education, for the Department of Registration and Education." [In other parts of the Act, from information furnished by the Governor's office, it appears that the officers of this department are as follows:

Director, Francis W. Shepardson, Chicago. Salary, $5,000.00.

Assistant Director, Ernest A. Wreidt, Chicago. Salary, $3,600.00.
Superintendent of Registration, Fred C. Dodds, Springfield. Salary, $4,200.00.]

"*Section 7.* . . . . . .

"Neither the Director, Assistant Director, Superintendent of Registration, nor any other executive and administrative officer in the Department of Registration and Education shall be affiliated with any college or school of medicine, pharmacy, dentistry, nursing, optometry, embalming, barbering, veterinary medicine and surgery, *architecture, or structural engineering*, either as teacher, officer, or stockholder, *nor shall he hold a license or certificate to exercise or practise any of the professions*, trades, or occupations regulated."

From this it will appear that no architect can have any executive authority in enforcing the law, as was the case formerly with the State Board and its officers. The professional relation of architects and the voice of organizations of architects will be explained later on. The same is the case with structural engineers.

"*Section 16.* The director of each department is empowered to prescribe regulations, not inconsistent with law, for the government of his department, the conduct of its employees and clerks, the distribution and performance of its business, and the custody, use, and preservation of the records, papers, books, documents, and property pertaining thereto."

This undoubtedly insures the preservation of all the records, papers, and filed documents of the State Board of Examiners of Architects accumulated during the last twenty years, all of historical value and precious for reference during succeeding years; but, as far as the rules of procedure of the old board, which were authorized by law, are concerned, it remains to be seen how far the Director of twenty-one subsidiary departments, who is not an architect and not technically acquainted with the usages of the profession, will renew and reëstablish them for his own governance. They were the result of nineteen years of experience in executing the license law, were last amended in 1916 and published, with the last biennial report in January of the present year. It will also be noted in the section above quoted that the Director has absolute authority to make such rules independent of the law under which the old board received its authority. It is expected, however, that he will pay due respect to the opinions of his predecessors in exercising this authority.

"*Section 17.* Each department shall maintain a central office in the Capitol Building at Springfield, in rooms provided by the Secretary of State."

The former office of the State Board in Chicago was closed July 1 and all its records and property removed to the Capitol Building at Springfield.

The following extracts from the new law have a more or less direct bearing upon the acts of the State Board of Examiners of Architects during the last twenty years, and do not seem to controvert any of them. The court decisions upon the law will doubtless hold as if the whole of the old law were in force.

"*Section 32.* Whenever rights, powers, and duties, which have heretofore been vested in or exercised by any officer, board, commission, institution, or department, or any deputy, inspector, or subordinate officer thereof, are, by this Act, transferred, either in whole or in part, to or vested in a department created by this Act, such rights, powers, and duties shall be vested in, and shall be exercised by, the department to which the same are hereby transferred, and not otherwise, and every act done in the exercise of such rights, powers, and duties shall have the same legal effect as if done by the former officer, board, commission, institution or department, or any deputy, inspector, or subordinate officer threof. Every person and corporation shall be subject to the same obligations and duties and shall have the same rights arising from the exercise of such rights, powers, and duties as if such rights, powers, and duties were exercised by the officer, board, commission, department, or institution, or deputy, inspector, or subordinate thereof, designated in the respective laws which are to be administered by departments created by this Act. Every person and corporation shall be subject to the same penalty or penalties, civil or criminal, for failure to perform any such obligation or duty, or for doing a prohibited act, as if such obligation or duty arose from, or such act were prohibited in, the exercise of such right, power, or duty by the officer, board, commission, or institution, or deputy, inspector, or subordinate thereof, designated in the respective laws which are to be administered by departments created by this Act. Every officer and employee shall, for any offense, be subject to the same penalty or penalties, civil or criminal, as are prescribed by existing law for the same offense by any officer or employee whose powers or duties devolved upon him under this Act. All books, records, papers, documents, property, real and personal, unexpended appropriations, and pending business in any way pertaining to the rights, powers, and duties so transferred to or vested in a department created by this Act, shall be delivered and transferred to the department succeeding to such rights, powers, and duties.

"*Section 33.* Wherever reports or notices are now required to be made or given, or papers or documents furnished or served by any person to or upon any officer, board, commission, or institution, or deputy, inspector, or subordinate thereof, abolished by this Act, the same shall be made, given, furnished, or served in the same manner to or upon the department upon which are devolved by this Act the rights, powers, and duties now exercised or discharged by such officer, board, commission, or institution, or deputy, inspector, or subordinate thereof; and every penalty for failture so to do shall continue in effect.

"*Section 34.* This Act shall not affect any act done, ratified, or confirmed, or any right accrued or established, or any action or proceeding had or commenced in a civil or criminal cause before this Act takes effect; but such actions or proceedings may be prosecuted and continued by the department having jurisdiction, under this Act, of the subject matter to which such litigation or proceeding pertains."

The following section provides for the abolition of about one hundred and twenty-five State boards, commissions, and offices comprising more than two hundred officials and two thousand employees. This is the most important feature of the so-called "Consolidation" act, which is intended to simplify the whole system of State government by retaining those branches which are essential and preventing overlapping authority; abolishing offices long since found to be useless, among which were many sinecures which were only of political importance to those holding them. So far as concerns the architects' and engineers' boards, the boards themselves and the officers under them only, are abolished, and the laws under which they were appointed remain in force, their duties and authority only being transferred to the Director of the twenty-one offices comprised in his department including all of the professions and occupations heretofore regulated by law.

"*Section 35.* The following officers, boards, commissions, arms, and agencies of the State government heretofore created by law, are hereby abolished, viz.:— . . . . . .
State Board of Examiners of Architects, State Board of Examiners of Structural Engineers, Secretary of the State Board of Examiners of Structural Engineers, Secretary-Treasurer of the State Board of Examiners of Architects. . . . . ."

The following extracts from different sections further pertain to the duties and authority of the

DEPARTMENT OF REGISTRATION AND EDUCATION

"*Section 58.* The Department of Registration and Education shall have power:—

. . . . . .

"(4) To exercise the rights, powers, and duties vested by law in the State Board of Examiners of Architects;

[and of all the other State boards that are not abolished.]

"*Section 60.* The Department of Registration and Education shall, wherever the several laws regulating professions, trades and occupations which are devolved upon the department for administration so require, exercise, in its name, but subject to the provisions of this Act, the following powers:

"1. Conduct examinations to ascertain the qualifications and fitness of applicants to exercise the profession, trade, or occupation for which an examination is held; and pass upon the qualifications of applicants for reciprocal licenses, certificates, and authorities;

"2. Prescribe rules and regulations for a fair and wholly impartial method of examination of candidates to exercise the respective professions, trades, or occupations; . . . . . .

"6. Conduct hearings on proceedings to revoke or to refuse renewal of licenses, certificates, or authorities of persons exercising the respective

professions, trades, or occupations, and to revoke or to refuse to renew such licenses, certificates, or authorities;

"7. Formulate rules and regulations when required in any act to be administered.

"*None of the above enumerated functions and duties shall be exercised by the department of registration and education, except upon the action and report in writing of persons designated from time to time by the director of registration and education to take such action, and to make such report, for the respective professions, trades and occupations as follows:*

. . . . . .

"*For the Architects, five persons, one of whom shall be a member of the faculty of the University of Illinois, and the other four of whom shall be architects residing in this State, who have been engaged in the practice of architecture at least ten years.*

. . . . . .

"The action or report in writing of a majority of the persons designated for any trade, occupation, or profession, shall be sufficient authority upon which the director of registration and education may act.

"In making the designation of persons to act for the several professions, trades, and occupations *the director shall give due consideration to recommendations by members of the respective professions, trades, and occupations and by organizations therein.*

"Whenever the director is satisfied that substantial justice has not been done either in an examination or in the revocation of or refusal to renew a license, certificate, or authority, he may order re-examinations or re-hearings by the same or other examiners.

"*Section 61.* All certificates, licenses, and authorities shall be issued by the department of registration and education, in the name of such department, and with the seal thereof attached."

This concludes a compilation of the sections and parts of sections in the Act, directly or indirectly referring to architects, and, in connection with all the clauses in the old law not eliminated by the Act, comprises the license, or registration law of the State of Illinois for architects as now in force.

The Administration of the Law

I am advised by the Department of Registration and Education that it has not been determined yet what amount will be paid to the examiners of the various professions, but in the case of the architects it will not be less than $10 per day, as formerly provided for members of the State Board of Examiners of Architects. They will also receive their traveling expenses. There is an appropriation sufficient to pay for such services. The Director has power to determine the compensation. The Superintendent of Registration will have charge of all of the administration work in connection with the examining and licensing of the professions, trades, and businesses now being licensed by the State. He is subject to the orders of the Director of Registration and Education, who is the supreme authority in his department. The Superintendent of Registration simply is the head of a division in the department and is subordinate to the Director.

The Department is authorized to establish branch offices in other parts of the State should it be necessary. Employees will all be under Civil Service rules.

Annual reports to the Governor, of all departments, will be made in December of each year.

Conclusion

It must now be a comfort to those who hug to their breasts the delusive idea that the registration of architects is something more respectable and honorable than licensing them, to know that the architects of Illinois are now *registered* under this act. That is, they are *registered* because they were *licensed;* the license "permitted" them to be registered in the Department of Registration and Education. This is the proper use of the terms. But whether this is a licensing or registration law is a matter of little importance. The law confirms the acts of the old licensing board, and puts all architects under the authority and discipline of State officers. It is simply another step in the progressive legislation of 1897 which first gave architects a legal status in this country. Many of the states have followed, or tried to follow the lead of Illinois, but few of them have succeeded in doing it all. In several states such laws were introduced in legislatures during the present year. Some were for licensing, some for registration. Some passed and some did not. Now their advocates will have another chance to sit up and make another study of Illinois' experience. New York got its registration law amended but it did not succeed in its main purpose, and get around the opinion of its own attorney-general, that a man who had called himself an architect could continue to do so, and could not be compelled to register. The law there only enables a man to be protected by calling himself a "Registered Architect," after he is registered. I can not see why anyone should want to call himself a "Registered Architect" if he did not want to be registered or could not get registered if he wanted to.

The Illinois architects are in good company because the new Department under which they are enrolled is not only a Department of Registration, but of *Education* also. It has authority over all educational matters in the State except the University of Illinois, which has a special and old charter; but the Department is already coöperating with it in certain matters, such as the Geological Survey. Some day this new department may take up the subject of architectural education, as recommended by progressive architects, which the Institute, the Chapters, and the architectural press have recently been discussing so extensively. It may establish colleges of architecture and other fine arts not controlled by the Trustees of the University. But as long as the feeling for coöperation continues its examinations may continue to be held at the University as has been the case for many years last past. It will be noted that one member of the examining committee must still be a member of the Faculty of the University.

The organized architectural associations are recognized in the new law. That means the Illinois Chapter of the Institute, which is a State Chapter and the Illinois Society of Architects which is also a State organization. It is on their advice and recommendation that the Director of the Department must appoint all committees for conducting examinations for license or instituting trials for violation of the law.

This reform is the result of many years of dissatisfaction with the work of the old board of examiners—though not always expressed with due regard to justice—which never was entirely free from political appointees in its membership, and which for some years last past has lacked the respect and support of the best element in the architectural profession.

As the original law was an experiment, so also is this change, to a certain extent, an experiment. It will have to be tried out practically. The architectural profession now has an opportunity to exert a direct influence upon the enforcement of the law. If it is not a success its failure may lie at the door of the architects of the state and their organizations. Both have advocated its enactment.

STANDARD INDICATIONS OF MATERIALS FOR ARCHITECTVRAL DRAWINGS

INDICATION		MATERIALS
	1	RVBBLE
	2	STONE OR GRAVEL CONCRETE
	3	CINDER CONCRETE
	4	CONCRETE BLOCKS
	5	CVT OR CAST STONE
	6	MARBLE
	7	BRICKWORK
	8	ARCHITECTVRAL T·C·
	9	STRVCTVRAL T·C·
	10	GYPSVM BLOCKS
	11	STANDARD PARTITION
	12	WOOD PARTITION OR WALL
	13	METAL LATH AND PLASTER PARTITION
	14	STEEL & IRON
	15	EARTH
	16	WATERPROOFING
	17	SHEET METAL & ROOFING
	18	ROVGH WOOD
	19	FINISHED WOOD FOR DETAILS ONLY
	20	PLASTER OR STVCCO FOR DETAILS ONLY
	21	GLASS & MIRRORS FOR DETAILS ONLY

NOTES

INDICATION NO·12 TO HAVE A CRAYON POCHE WHICH PRINTS WHITE

INDICATION NO·11 FOR VSE WHEN PARTITIONS ARE THE SAME MATERIAL THROVGHOVT STRVCTVRE, THE SPECIFICATIONS DESCRIBING THE MATERIAL

HATCHING AND STIPPLING IS IN DILVTE INK

INDICATIONS NOS·1 TO 18 INCL· ARE AT SCALE OF 4 FEET TO 1 INCH AND ARE INCREASED PROPORTIONATELY FOR LARGER SCALE OR FVLL SIZE DRAWINGS· INDICATIONS NOS·19 AND 20 AT ¾ INCH TO THE FOOT AND NO 21 AT FVLL SIZE

MATERIALS IN ELEVATION TO BE INDICATED BY LETTERING

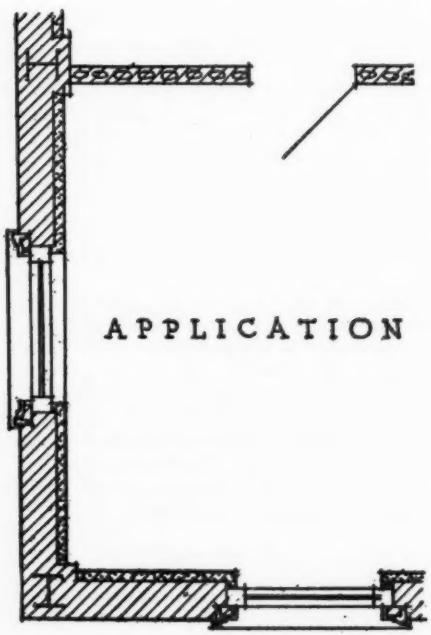


Diagram of Proposed Standard Indications of Materials

Proposed Standard Indications of Materials

FOR USE ON ARCHITECTURAL DRAWINGS

THE Standing Committee on Contracts and Specifications of the American Institute of Architects has, with the approval of the Board of Directors, had for some time under consideration standard indications for materials for use upon architectural drawings.

Such a standardization for electrical wiring, outlets, etc., adopted by the National Electrical Contractors' Association and approved by the Institute, is now generally in use and has proved of advantage to contractors, engineers, architects, and draughtsmen. Well-designed standard indications for building materials should, in their larger field, be of even greater advantage to all concerned.

A scheme for such indications was prepared for criticism by the Standing Committee a year or more ago, but of late the work has been in the hands of a subcommittee of which Mr. J. A. F. Cardiff is chairman. The first tentative form prepared by the subcommittee received the criticism of many architects, out of which has grown a second tentative diagram, now published in the Journal in the hope that architects and draughtsmen may express their opinions as to the suitability of the proposed symbols.

The subcommittee accompanies its tentative diagram with the following comment:

"The only changes from the earlier draft are with respect to the first three indications, No. 1 being revised and Nos. 2 and 3 being definite indications in place of the alternatives originally shown. These changes are the result of the criticisms elicited by the circulation of the earlier forms. The rest of the indications received favorable comment from a large majority and have therefore been retained, but the minority recommendations will be outlined hereinafter.

"*Scope.*

Indications have been provided only for such materials, mainly structural, as are ordinarily shown on the working drawings by some method of hatching, stippling, or poché. The materials which constitute the "interior finish" have been omitted on the ground that they are matters for the specification or for a schedule or synoptic form accompanying either the drawings or the specification.

"The subcommittee believes that materials in elevation can best be indicated, both as to kind and extent, by lettering, and this is the consensus of opinion of those who criticised the first form. While no other indication is necessary from the standpoint of clearness, architects do frequently stipple or otherwise render the elevations to give expression to the design. This, however, rather than justifying standardization, would seem to point in the other direction—leaving the indication to the individual taste of the designer.

"In the case of alterations to existing buildings, the new work would be indicated as in new buildings. For the existing work which remains undisturbed and for existing work which is to be entirely removed, indications were suggested in the criticisms of the first draft, but they were not indications of *materials*. It is our belief that there is little or no need for indicating the materials of existing work in such cases, and that an indication to show only the proposed change in *arrangement* has no place in such an Indication of Materials.

"*Indications.*

Clearness, simplicity, and rapidity, and with these, some regard for the appearance of the finished drawing, should govern in determining the character of the indications. They should be of a nature such as will not be confusing under slightly differing interpretation at the hand of the *average* draughtsman.

"Indication No. 1 is readily differentiated from brickwork and cut stone with which it frequently comes in contact. Alternatives which were suggested are (a) freehand wavy lines, (b) a more open stippling than the cut stone indication, and (c) diagonal dotted-line hatching.

"Indications Nos. 2 and 3 have been widely used for some years. Others suggested are (a) the letter "S" in No. 2 and the letter "C" in No. 3 in place of the quirks shown, as signifying respectively, stone (or gravel) and cinders; (b) triangles in place of the circular quirks in No. 2 and (c) freehand wavy lines for No. 3.

"Indication No. 4 in actual test executed quite rapidly, and it suggests the material. An alternative proposed is diagonal dotted-line hatching.

"Indication No. 5 has long been a standard for cut stone. Two objections were made to its employment for cast stone, one contending that we should differentiate and the other that cast stone and concrete blocks should have the same indication—that which we have illustrated for concrete blocks. Another alternative suggested is diagonal hatching of lines alternating solid and dotted.

"Indication No. 6. Stippling the same as cut stone has been recommended for this.

"Indications Nos. 7, 8, 9, and 10. For these materials, which occur with the greatest frequency, the base is diagonal hatching—the simplest and quickest indication of all. The lines may be drawn through all four materials in one operation, as shown in the Application. The hollow tile and gypsum blocks are subsequently and quickly given the differentiating stipple or oval. Substitutes suggested for structural terra cotta are (a) freehand wavy lines and (b) perpendicular hatching. Substitutes for gypsum blocks are (a) freehand diagonal wavy lines, (b) perpendicular hatching with a crayon poché, and (c) stippling instead of diagonal hatching with the ovals retained.

"Indication No. 11 is designed as a time-saver for use when the partitions are the same material throughout, whether wood, tile, gypsum, or plaster, the specification establishing the material. Where there are some exceptions, as for instance hollow tile partitions about stairways with gypsum blocks elsewhere, the hollow tile would have the regular No. 9 indication and the gypsum block partitions the "standard partition" indication.

"Indications Nos. 12 to 21 inclusive need no special comment and no alternatives have been suggested in the criticism received.

"An indication which has not been made use of, for reasons both of speed and appearance, is the freehand wavy line. It has been suggested so frequently, however, for one material or another that it would seem to warrant special thought when this draft is circulated for criticism.

"Another point to which special thought should be given is the suitability of the indications for one-eighth scale drawings, for while that scale is perhaps not as frequently used as quarter scale, it is nevertheless so much in use that standard symbols should be just as applicable in its case as in that of the larger scale."

As it is obviously of importance that the Institute should adopt only a thoroughly practical system of indications the Standing Committee will greatly appreciate expressions of approval, constructive criticisms or suggestions for the improvement of the diagram. All communications should be sent to the chairman, Mr. Frank Miles Day, 925 Chestnut St., Philadelphia, not later than October first, 1917.

News Notes

National Conference Committee on the Quantity System

Mr. Sullivan W. Jones, representative of the Institute on the National Conference Committee to consider the Quantity System as a means of checking the economic waste in the present method of competitive bidding, reports that the Committee will hold its first meeting at the Octagon about the middle of October, and that of the eighteen associations invited to send representatives, ten have agreed to do so and three others have promised to take the matter up at meetings in the near future.

Wrong Methods of Advertising the Architect

At the Board meeting in September, an account of which will appear next month, the two following resolutions were adopted:

Resolved, That the Board of Directors condemns as contrary to the spirit of the Canons of Ethics the issuance by Members of the Institute of professional treatises or monographs of their work in the form of books or pamphlets, whether privately printed or published through regular channels, which are supported by advertisements.

Resolved, That the Board of Directors condemns the issuance of catalogues of architectural exhibitions which are supported by advertising, as injurious to the profession because the support so given is in the nature of a contribution which the advertiser dislikes to refuse to make, rather than a payment made for value received, and believes that those holding such exhibitions should give consideration to other unobjectionable means for financing them.

It was with some regret that the Board deemed it necessary to take explicit action in these matters, yet it felt that there still lingers a misunderstanding of the fact that advertising is today a commodity, the values of which have been pretty well established. Thus, many practices which, although never justifiable, once passed muster as a friendly contribution to this or that cause, are now frankly recognized as wrong. Advertising has become a well established business based upon sound methods of selling space, and it has been definitely determined that advertising in such catalogues or year-books has little, if any value; thus the sale of such space sets up a relationship which injures both the buyer and the seller. It is true that some societies now find themselves in a position where they must either continue the publication of an exhibition catalogue from which they derive a considerable advertising revenue, or else forego valuable educational work which they have been building up over a period of years. The Board recognizes this contingency, but believes that through careful study, some unobjectionable means of raising money can be found, and it was suggested that a conference of such societies be held in the near future for the purpose of discovering a solution of the problem.

Personals

The firm of Graham, Burnham & Company has been dissolved. Messrs. Ernest R. Graham, Peirce Anderson, Edward Probst, and Howard J. White will continue the practice of architecture at 1417 Railway Exchange, Chicago, as Graham, Anderson, Probst & White.

Messrs. Hubert Burnham and Daniel H. Burnham will continue the practice of architecture in the Rookery Building, Chicago, as D. H. Burnham & Company.

Perkins Fellows & Hamilton announce the removal of their offices to 814 Tower Court, Chicago.

Mr. Edwin H. Hewitt, of Hewitt and Brown, Minneapolis, has sailed for France to assist in the Y. M. C. A. work on behalf of our troops. Mr. Edwin H. Brown of the same firm is now stationed at the Red Cross Distribution Depot at Deming, N. M.

Mr. W. M. Somervell, of Seattle, has been commissioned Major E. O. R. C., awaiting orders in Washington.

Preserving Architectural Types in the Devastated French Provinces.

"La Maison des Pays de France," the text by M. Leandre Vaillat, editor of *Le Temps*, Paris, and 80 drawings by M. André Ventre, architecte en chef des Monuments historiques, illustrates the principal types of houses in Flanders, Artois, Picardie, Ile de France, Champagne, Lorraine, and Alsace.

The Journal will be glad to secure copies of this book for its readers at the price of $2 each.

Structural Service Department

D. KNICKERBACKER BOYD, *Associate Editor*

PLUMBING ISSUE

HYDRAULICS—SANITATION—PUBLIC HEALTH

CONTENTS

A consideration of the subject of "Plumbing" involves at once a broad human problem which takes in the health of individuals, communities, and the country at large. There will, consequently, be found in this issue reference to considerations which include, first, the source of any water-supply, then its storage or impounding, its distribution, and its purification. Next comes its utilization, which has been considered with respect to the materials and methods involved in general plumbing installations in and around all forms of human habitations. Finally comes the question of disposal of sewage and waste. Information and activities concerning all these subjects have been recorded as fully as possible within the limitations of a treatise devoted to aspects within the purview of architects and other constructionists.

INDEX TO SUBJECTS TREATED IN THIS ISSUE

(For index of materials previously treated see the General Index, page 472)

9A U. S. Government Specifications and Publications.
9B Public Health, Water Works, Plumbing and Other Associations.
9C1 Housing Associations and Other Volunteer Organizations.
9C2 Other Allied Interests and Influences.
9C3 Educational and Research Work.
9D Water-Supply, Storage, Utilization and Incoming Pipes.
9E Filtration and Water Treatments.
9F Heating and Cooling of Water.
9G Plumbing Installations in General.
9H Fixtures and Fittings.
9H1 Bathroom and Laundry Finishes and Accessories.
9J Swimming-Pools, Baths, Bath- and Change-Houses.
9K Sprinklers and Fire Protection.
9K2 Safeguarding Industry—A Wartime Necessity.
9L Outgoing Pipes, Sewage Disposal, and Public Health.

9A U. S. Government Specifications and Publications

1. Composed of representatives of the Treasury, War and Navy Departments, there is a Board on Uniform Plumbing Specifications. This Board has issued (March 1, 1916) a "Specification for Plumbing Fixtures, etc., for the Treasury, War and Navy Departments."

   It is stated that "These specifications are published for the purpose of facilitating construction in the governmental departments concerned. They are not to be construed as prohibiting the installation of any fixture desired for a special purpose and covered in the specifications for any particular work."

   These specifications consist of 147 pages of printed matter, including 53 plates showing in detail all types of plumbing fixtures and their connections. They cover general requirements for all kinds of piping and various wares, and form the basis of the specifications for each particular installation prepared by these departments. They are also so used by some architects in their regular practice.

   These specifications may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., at 75 cents a copy.
2. The Navy Department issues specifications for "Naval Stores and Materials," as described under 3A1*a*; those pertaining to plumbing materials, other than the fixtures and fittings referred to above, will be found completely listed in the "Index to Specifications" (3A1*a*1).
3. For publications by other governmental departments concerning materials, devices, and workmanship pertaining to hydraulics and sanitation, see the listings under the different subdivisions

9B Public Health, Water Works, Plumbing, and Other Associations

9B1 *American Public Health Association*

Secretary: Salskar M. Gunn, 126 Massachusetts Ave., Boston.

Publications:

(*a*) "American Journal of Public Health."
(*b*) Also, "Standard Methods for the Analysis of Water, Sewage, Air, and Milk."

Its objects are to protect and promote public and personal health. The Association has seven sections: Laboratory, Public Health, Administration, Vital Statistics, Sanitary Engineering, Sociological Industrial Hygiene, and Food and Drugs.

9B2 *American Society of Sanitary Engineering*

President: Wm. C. Groeniger, State Health Dept., Columbus, Ohio.

Publications:

(*a*) Proceedings of Annual Meetings.

Composed of inspectors of plumbing; sanitary engineers, health officers, and others interested in its objects. Any manufacturer of sanitary goods is eligible as a contributing member. Committees of the Society engaged in work of interest to architects and builders are: on Research;

Causes of Iron Rust in Domestic Water-Supply; on House-Traps; on Standardization of Brass Goods; on U. S. Standards with respect to Plumbing Installation in Government Buildings.

9B3 *Water Works Associations*

Of great importance are the results accomplished by organizations formed to advance the design, construction, operation, and management of water works. These include:

9B3a *American Water Works Association*

Secretary: J. M. Diven, 47 State St., Troy, N. Y.

Publications:

1. The Journal of the American Water Works Association. Quarterly: March, and thereafter. Supplements give the proceedings of the annual conventions and lists of officers, committees, and members.
2. Standard Specifications for Cast Iron Water Pipe and Special Castings (adopted May 12, 1908).
3. Standard Specifications for Hydrants and Valves (adopted June 24, 1913; revised June 9, 1916).

A joint committee is now at work on revisions of these standards.

Other committees working on subjects of interest to architects and constructors are those on: Electrolysis, Standard Specifications for Wrought Iron Pipe, Plumbing Code and Control of Plumbers, City Planning, and Private Fire Protection Service.

9B3b *New England Water Works Association*

Secretary: Willard Kent, Narragansett Pier, R. I.

Publications:

1. Journal of the New England Water Works Association. Quarterly. Contains papers presented at the six regular meetings each year, with discussions, and list of officers and reports of committees.
2. Standard Specifications for Cast-Iron Pipe and Special Castings. (Adopted Sept. 10, 1902.)
3. Index. Lists articles, papers and other information contained in "The Transactions," from 1883 to 1885, and in the Journal from Volume I to date.

9B3c *Water Works Manufacturers' Association*

Secretary: E. K. Sorenson, 15 Broad Street, New York City.

Issues no publications.

9B4 *National Association of Master Plumbers of the U. S.* Organized 1883.

Secretary: A. A. Zertanna, 4337 Manchester Ave., St. Louis, Mo.

Publications:

(*a*) Convention Proceedings, published annually.

Aims to establish harmonious and equitable relations between master plumbers, hydraulic and sanitary engineers, journeymen plumbers, and other employees, and manufacturers and jobbers in supplies used in plumbing, heating, gas-fitting and the drainage business; to educate apprentices in plumbing and to establish an apprenticeship system; and to promote the standardization of fittings and other plumbing goods.

This Association, together with the National Association of Master Steam and Hot Water Fitters, was represented in a joint conference in November, 1913, with the American Institute of Architects to consider the advisability of the direct letting of mechanical equipment contracts, which resulted in the adoption by the Institute of the resolution quoted under 9G*a*.

9B5 *Cast Iron Soil Pipe Makers' Associations*

Eastern Soil Pipe Association

Secretary: Chas. F. Tuttle, 269 Clinton Ave., Brooklyn, N. Y.

Southern Soil Pipe Association.

Secretary: M. W. Bush, Birmingham, Ala.

Publications:

(*a*) "Complete Specification for Cast-iron Soil Pipe and Fittings."
(*b*) "A Nation-wide Comparison of House-drainage Piping."
(*c*) "Cast-iron Soil Pipe vs. Wrought Pipe—for House-drainage."
(*d*) Numerous reprinted technical papers pertaining to house-drainage piping.

Copies of any of the above will be sent upon application.

The chief object of these Associations is to standardize the manufacture of all extra heavy cast-iron soil pipe and fittings so that a single specification covers the product used by all consumers. These specifications are for adoption in Federal and municipal plumbing rules or regulations and cover in detail the weights of fittings as well as pipe, the quality of iron used in pipe, testing of pipe, marking, dimensions and radii of bends, hubs, etc. Another object of these Associations is to promote sanitation by the use of cast-iron soil pipe for all house-drainage, that is for house-sewers, house-drains, soil-stacks, vents, and leader lines.

9B6 *American Concrete Pipe Association*

Secretary-Treasurer: J. H. Libberton, 210 S. La Salle St., Chicago, Ill.

Publications:

(*a*) Proceedings of Annual Conventions, containing papers and discussions on all phases of the manufacture, use, and application of cement sewer pipe and drain tile.

This organization is composed entirely of men who are interested in concrete sewer pipe, irrigation pipe, and drain tile, either as manufacturers of the pipe itself or as manufacturers of equipment for making such pipe.

The Association coöperates with the A.S.T.M. and other organizations in the formulation of standard specifications.

9B7 *The Sewer Pipe Manufacturers' Association*

Field Commissioner: John L. Rice, Second National Bank Building, Akron, Ohio.

Publications:

(*a*) "Vitrified Clay Pipe." 32 pp., illus. Contains description of Salt Glazing, Results of Tests, and Specifications for Sewer Pipe and the Laying of Sewer Pipe.
(*b*) "About Culverts." 32 pp., illus. Contains Basic Principles, Types, Definitions, Sizes, Costs, Diagrams and Culvert Design, the latter by P. K. Sheilder from Proceedings of Ohio Engineering Society.
(*c*) "Clay Products for Building Construction." 32 pp., illus. Concerns Vitrified Clay Pipe for House Drains, Wall Copings, Flue Linings, and Fire Clay Chimney Tops, and contains Building Code Suggestions and diagrams from publications of the N.B.F.U. and the N.F.P.A.

This Association was formed for the purpose of promoting the welfare of the sewer pipe industry and to the end that the public might be more fully informed as to the adaptability of vitrified clay pipe and other clay products and as to the best manner of using them.

A committee is now working on the subject of standardized practice with respect to the manufacture and laying of sewer pipe.

9C1 Housing Associations and Other Volunteer Organizations Which Work for Improvement of Sanitation in Buildings

(Written for the Journal by John Ihlder)

The importance of good sanitary standards is becoming generally recognized, but the old easy distinction between what is necessary for me and what for the other fellow still makes necessary a great amount of educational work. In our progressive cities the operative builders find it so difficult to sell or rent new houses without sanitary toilets and even bathtubs, that they themselves often build the sewers.

This applies not only to expensive houses for the well-to-do, but, in some cases, even to the less expensive for the wage-earner. In cities where it is the policy for the municipality to pay all or a considerable proportion of the cost of sewer-extension out of general funds, as in Philadelphia, the builder of wage-earners' houses, who must work on the smallest possible margin, is between two influences. He cannot build sewers at his own expense enentirely and yet compete with the builder on a city-sewered street; he cannot sell his houses unless he at least holds out a promise that they will have modern sanitary conveniences. This creates a strong demand for rapid sewer extension, but pending such extension he does all he can. For instance, I saw recently a group of three-bedroom brick houses on the far outskirts of southwestern Philadelphia, now nearing completion, which are to sell for $2,600—a low price in these times. Each has a good-sized bathroom containing tub and basin and pipes for water-closet. The waste from tub, basin, and kitchen sink flows into a temporary wooden sewer that empties into a nearby creek. In the back yard is a temporary privy which will be replaced by a water-closet in the bathroom as soon as the Ward Business Men's Improvement Club—of which the builder is a very active member—can secure an extension of the city sewer system. Without these visible tokens of an imminent change at minimum expense the houses would not be salable.

This is in part a result of the work of housing associations and committees which for years have insisted that the well-being of the community demands as good sanitary conditions for the wage-earner's family as for families of those of a higher economic status. Not only has the wage-earner himself come to accept this, but public opinion has begun to support it also.

So the sanitary problem of the new house seems to be nearly settled with the acceptance of a sound public policy backed by the continued interest of those most directly concerned. But this very acceptance of a right policy for new houses makes more difficult the problem of the old house in the poorer districts of our large cities in the East. Here are large areas where houses were built long before modern sanitation began, before the modern water-closet had been invented, before the stationary bathtub had been thought of. In these houses the operative builder has considerably less than no interest—they compete with his new houses, and he is quite willing that they should not be made more attractive than their central location inevitably makes them. Moreover, where the city pays all or a considerable part of the cost of sewer extension, there is such competition for a share in the appropriations that these rarely suffice to go around. The owners of the old houses are frequently indifferent. To begin with, they often have a backward-looking instead of forward-looking habit of mind. Their houses never had sanitary conveniences. Frequently they are houses that once sheltered the city's aristocrats. What was good enough for the former inhabitants certainly is good enough for the present ones. This habit of mind is buttressed by the fact that the houses, being centrally located, are usually easily rented so long as they are at all habitable. The immigrant is not particular. What he desires most is to live among his countrymen and to be near his work. Why then should the owner go to any expense to remodel and refit the old building? So in these old districts the housing workers and allied groups have a distinct and more difficult task since they are working for a population whose ignorance makes them comparatively indifferent and against, instead of with, a strong group who have financial interests in the properties. Yet even here they are making notable progress, backed though they are only by a slowly awakening public opinion and by a slowly increasing knowledge on the part of the inhabitants as to what unsanitary conditions mean to them personally.

In some of the smaller cities, even in the East, there are practically no houses without sewer-connected sanitary conveniences, as in Savannah, Ga., and Mt. Vernon, N. Y. Washington has reached almost as high a standing. In New York City practically all the tenement houses are equipped with sanitary water-closets, and an increasing proportion have bathtubs. In Baltimore, where a new sewer system and disposal plant have recently been completed, it is proposed to require that every dwelling in the city shall be sewer-connected, and it is already required that every new house containing four or more rooms shall have a bathtub with all necessary supply and waste pipes.

Even in Philadelphia, where past neglect has permitted the development of very unsanitary conditions, there has been notable progress in recent years. According to the official figures more than 8,000 privy vaults are being abandoned annually and sanitary water-closets installed in their places. Were it not for the building of new vaults on unsewered streets, Philadelphia might look forward with confidence to the end of this menace within a few years, despite the opposition of some owners and the slowness of sewer construction in the oldest districts. In these districts there are still approximately 30 miles of unsewered streets. Illustration of the worst of them is a dead-end segment of Spring Street near the Delaware River. Spring Street at this point is only about 12 feet wide. Opening off it is a court where stands an old house on the site occupied by Benjamin Franklin's home in 1748. The houses here are packed so closely together that in one place it has been necessary to make a two-story privy to provide for four houses. The Bureau of Surveys does not wish to put such dead-end streets on the city plan because they should not be perpetuated. Unless a street is on the city plan, sewer extension can not be compelled. Some of the owners—among them resident owners—do not wish the expense of sewer extension and connections. The city has not the power and there is as yet no public opinion in favor of clearing and replanning such an area.

It is with such complicated situations as this that housing workers in the older cities are compelled to deal. Considered individually such situations are almost hopeless; only the slow and uncertain extension of business and industrial areas can wipe them out. But we are getting beyond the individual situation to the development of city-wide policies in city planning and rebuilding. In that lies our main hope and to that we are led by our desire to improve the sanitation of the individual house. Plumbing

has wide ramifications. The well-to-do recognize its importance for themselves. The more ambitious of the wage-earners are willing to sacrifice time and carfare to secure it for themselves. Public opinion recognizes its desirability in a general way but has not yet become convinced of its necessity for the immigrant and the unskilled laborer.

To show this necessity is one of the tasks of housing associations and committees. New York, because it first developed intolerable conditions, was the first to make serious efforts for their reformation. It has had housing, or tenement house, committees for many years. The present committees of the Charity Organization Society and of the Brooklyn Bureau of Charities are very active organizations, and to the former New York owes its present tenement house law, enacted in 1901. Philadelphia, Boston, Pittsburgh, Washington, Chicago, and other large cities long ago organized committees or conferences to work for better sanitation and housing. The first of these had their inception among people interested primarily in social work among the poor, for to them came first-hand knowledge. But of late years chambers of commerce and other organizations have taken up the work because of its direct effect upon the continued prosperity of the community. Philadelphia was the first city to establish an independent housing association which should deal with all phases of the question and coördinate the work of all other agencies so far as they touch housing. This the Association's independent position has enabled it to do much more effectively than could a committee of an organization having other interests. There are now nearly seventy agencies in Philadelphia coöperating with the Housing Association by reporting to it the unsanitary conditions they find in the course of their work. Among these are hospitals, social settlements, local improvement societies, and such business organizations as the Chamber of Commerce.

The organization of the Philadelphia Housing Association in September, 1909, preceded by a few months that of the National Housing Association, which has had a great influence in stimulating interest throughout the country. Its annual conferences have been of great educational value. Largely as a result of its work there are now more than a hundred cities in which there are active organizations. Most of these are committees of charity organization societies, chambers of commerce, city clubs, or improvement associations. But several cities are progressing beyond this stage to that of the independent association which can devote all its energies to housing and can more effectively coördinate the housing work of other agencies. Among these are Chicago, Cincinnati, and Pittsburgh. There are several state organizations, like the Pennsylvania Housing and Town Planning Association, the Indiana Housing Association, and the New Jersey Housing Association, besides committees of such state organizations as the Massachusetts Civic League. These hold annual conferences. Even in the national field housing has been recognized by the National Conference on City Planning (now the City Planning Institute) and by the National Real Estate Association, which has a housing committee.

In addition, there are in a number of cities housing companies that build and manage improved wage-earners' dwellings on a limited dividend basis. Some of the earliest of these, as is so often the case in first attempts, have ceased operations or have failed to live up to their promise. The oldest that has enjoyed continuous success is the Octavia Hill Association in Philadelphia, founded in 1896 and still growing. The Housing Association owes its being to the Octavia Hill Association, whose officers were its founders. Other conspicuous companies of this character are the City and Suburban Homes Company in New York City, the Sanitary Housing Company and the Sanitary Improvement Company in Washington, D. C., the Model Homes Company in Cincinnati, Ohio, the Woodlawn Company in Wilmington, Del., and the Improved Dwellings Company, in Brooklyn, N. Y. (See the pamphlet referred to under 9L39 which lists these companies, village improvement associations, and others.)

In all these developments the installation of sanitary conveniences is a conspicuous feature, as is evidenced in the names of some. While the later companies do not lay the emphasis upon sanitation that the older ones did, this means not that sanitation is considered less important, but that it has become so generally understood as not to require emphasis. The greatest single motive for this work, as in that of the increasing number of industrial villages now being built by the large corporations, is to provide sanitary dwellings for the wage-earner.

The increasing interest in this question is shown by the growing number of reports describing conditions in our cities. Illustrative of them are the reports published under the auspices of the Russel Sage Foundation on Springfield, Ill., Topeka, Kan., and Ithaca, N. Y., dealing with public health and with housing, and such independent reports as those on housing in Providence, R. I., Grand Rapids, Mich., Minneapolis, Cleveland, which concern themselves largely with sanitary conditions and methods for their improvement.—JOHN IHLDER.

[EDITOR'S NOTE.—In certain reports which will be found mentioned under the various subdivisions, particularly under 9L, references are made to the subject of sanitation and public health and to constructional work in connection therewith. Among these are: The Annual Reports of the Director General of the International Health Commission to the President of the Rockefeller Foundation; the Annual Reports of the Department of Engineering, City of Hartford, Conn., and others.]

9C2 *Other Allied Interests and Influences*

The American Ceramic Society, mentioned under 3C1, is an important factor in the development of porcelain and vitreous ware used in plumbing, in addition to which there are many state or local clay working associations which hold meetings and conventions.

There is record of the National Organization of Health Officials and also of the Confederated Supply Association, the latter representing the various associations of plumbing supply dealers, both of which are referred to under 9Gb.

There is also record of the Enameled Sanitary Ware Manufacturers' Association, concerning which no information has yet been obtained.

There is also the American Institute of Metals and the National Association of Brass Manufacturers and others which are interested in metal plumbing accessories. These will be described later under Metal Products.

For description of the Range Boiler Exchange see 9F1.

There are, of course, "labor organizations" of the artisans, mechanics, and others employed upon the various branches of the work embraced within a plumbing installation, an activity of one of which is referred to under 9K1.

9C3 *Educational and Research Work*

In the colleges, technical and other institutions of the country instruction in hydraulics and sanitation is being cared for. A list of many of such, including those wherein branches of the A.S.M.E. are located, was given under 1B3*a*.

A practical indication of interest from without was manifested when recently awards were made of the Nelson Prizes in Plumbing. These were presented through the

courtesy of the Cast Iron Soil Pipe Makers Advertising Association for the best papers on the "Practice or Theory of Plumbing" prepared by any student or instructor in Harvard University or the Massachusetts Institute of Technology, or by any student or instructor in other institutions of learning who had had training in the theory or practice of house-drainage. The Chairman of the Committee in charge of the awards was George C. Whipple, Professor of Sanitary Engineering, Harvard University, and the prizes were named for N. O. Nelson, a manufacturer of plumbing supplies who has devoted himself to the general improvement of living conditions.

First prize of $100 was awarded to Thomas J. Claffy, Assistant Chief Sanitary Inspector, Health Department, Chicago, Ill., for a paper entitled "Plumbing." Second prize of $50 to James W. Anderson, student graduating in the class of 1917 from the Massachusetts Institute of Technology, Cambridge, Mass., for paper entitled "A Study of the Different Types of Pipes Used in the Disposal of Rain Water from Buildings." Third prize of $50 to Walter G. Ward, Instructor, North Dakota Agricultural College, Agricultural College, N. D., for a paper entitled "Water Closet Connections."

A new contest similar to the one just completed, but involving awards approximating $750, is planned for the ensuing year.

9D Water Supply, Storage, Utilization and Incoming Pipes

Many publications are issued dealing with investigations and developments in connection with hydraulics, public water supplies, reservoirs, standpipes, pumping equipment, and other phases of this subject. These are also treated in the leading pocket-books, handbooks, and other literature prepared for the use of architects, engineers, and constructionists. Independent private water supplies will usually be found treated in the publications of the manufacturers which specialize in their production and installation. Much attention has been given to the development of standards in the manufacture of water pipes by associations and societies whose activities are elsewhere referred to and the results of which are listed under this heading and under those subdivisions which follow pertaining to water. The subject of trenching for and laying of pipes has been carefully studied, the interest in which is confined not alone to water or incoming pipes but to drains or outgoing pipes. In other ways the subjects of water-supply and drainage are interlaced and so closely related to the public health that the references under 9L which treat of outgoing pipes should also be consulted.

For Tanks, Reservoirs, and Tank Supports, being Regulations and Standards pertaining to these subjects, see April Journal 4D5.

1. The U. S. Geological Survey (2A1*b*) has published about 400 reports on various phases of water-supply and conditions likely to be met with in different parts of the country.
2. The U. S. Bureau of Mines (2A3) has issued:
   (*a*) Technical Paper 33, "Sanitation at Mining Villages in the Birmingham District, Ala." (9L1*a*), contains a section on "Water Supply."
   (*b*) Bulletin 87, "Houses for Mining Towns" (9L1*r*), contains sections on "Responsibility for Water Supply" and "Sources of Water Supply."
3. The U. S. Reclamation Service issues:
   (*a*) "List of Publications," No. 3, 1916. In same will be found many references to reports and bulletins on water supplies, farm plats, and town sites, including maps, specifications and drawings which may be had upon application to Arthur P. Davis, Director and Chief Engineer, 2212 First St., Washington, D. C., or the Superintendent of Documents, Government Printing Office, Washington, D. C.
   (*b*) "The Reclamation Record," a regular bulletin of service, issued monthly and contains many illustrated articles. Subscription 50 cents per year.
4. Read the "Indexes to Transactions and Proceedings" and other publications of the American Water Works Association, The N. E. Water Works Association, and others described under 9B for references to complete libraries of information on the subject, not alone of water, but of all appurtenances and allied subjects.
5. See "Review of Current Technical Literature" and *Journal* of the A.S.M.E. for information on all phases of this subject. Also reports of committees in that Society on Filter Standardization. See, also, Standards recommended in reports of committees received by the Council of the A.S.M.E. (Serial No. 10.) as follows:
   (*a*) Special Reports on Standard Pipe, Pipe Threads, and Pipe Unions.
   (*b*) Separate Reports on Standard Threads for Hose Couplings, Standard of Pipe Thread Gages, and Standard Thickness Gage for Metals.
   (*c*) The American Standard for Pipe Flanges, Fittings, and Bolting.
6. See "Proceedings" of the A.S.C.E. for lists of "Current Engineering Literature," on matters connected with water-supply. Also reports of the committee in that Society on "A National Water Law."
7. "Reservoirs," by James Dix Schuyler, 573 pp., illus., contains sections on Domestic Water Supply, Types of Dams, and the Methods, Plans, and Cost of Their Construction; also Distribution, Application, and Use of Water and the Rainfall and Run-off from various Watersheds.
8. "Water-Supply Engineering," A. Prescott Folwell. 570 pp., illus. Included in the Contents are: Sources of Supply, Gravity Systems, Pumping Systems, Hydraulics, Dams and Embankments, Pumping and Pumping Engines, Practical Construction, Pumping-plants and Filters, Pipes and Conduits.
9. "Waterworks Handbook," by A. D. Flinn, R. S. Weston, and C. L. Bogert. 824 pp., illus., 311 tables. Contents include: Dams, Wells, Equipment for Treating Water, Aqueducts, Pipes, Pumps, Pumping Stations and Equipment, Standpipes and Tanks, Non-ferrous Metals (also corrosion of iron and steel).
10. "Towers and Tanks for Water Works," J. N. Hazelhurst. 325 pp., illus.
11. "Water Works for Small Cities and Towns," John Goodell. 286 pp., illus. Contents include: Dams, The Utilization of Springs, Open Wells, Driven Wells, Deep and Artesian Wells, Pumps, The Air Lift, Pumping Stations, Pipes, and The Quantity of Water to Be Provided.
12. "Waterworks Distribution," J. A. McPherson. 175 pp., illus. A practical guide to the laying out of systems of distributing mains for the supply of water to cities and towns.
13. "Small Water Supplies," F. N. Taylor. 180 pp., illus. A practical treatise on the methods of collecting, storing, and conveying water for domestic use in country estates, small villages, and farms. Contents include: Wells and Well-sinking, Noises in Water Pipes and Their Causes.
14. "American Civil Engineers' Pocket Book," (9G22), Mansfield Merriman, pp. 914–927: Section on "Collection of Water."
15. "Elements of Sanitary Engineering," (9L15), Mansfield Merriman, contains information on "Water Supply Systems" and "New Water Supply for New York City."
16. "Clean Water and How to Get It," (9E1), Allen Hazen, treats of water-supply from various sources.
17. "Water Purification and Sewage Disposal," J. Tillmans. Translated by Hugh S. Taylor. 169 pp., illus. A critical survey of the work of German authorities in developing modern methods for suitable water-supplies and the adequate disposal of sewage.
18. "Treatise on Hydraulics," Mansfield Merriman. 565 pp., illus. Contents include, besides all Fundamental Data: Water Supply and Water Power, Water Wheels, Turbines, Pumps and Pumping.
19. "Treatise on Hydraulics," Henry T. Bovey. 582 pp. Contents include descriptions and illustrations of Rams, Presses, Accumulators, Water-pressure Engines, Vertical Water-Wheels, Turbines and Centrifugal Pumps.
20. "Water Power Engineering," D. W. Mead, 843 pp., illus. Covers the theory, investigation, and development of water power and presents fully the details of the entire engineering problem from the first investigation to the complete plant.
21. "Mechanical Equipment of Federal Buildings," Chapter IV (9G1—), contains a section on Water Supply, with information as to service installations and data on sizes and kinds of service pipes and branch water-supply pipes.
    See, also, p. 384 of this book for Table of Capacity of Cylindrical Tanks.

22. See "Sanitation of Public Buildings" (9G4), Wm. Paul Gerhard, for sections relating to water-supply and utilization.
23. See "Water Supply, Sewerage, and Plumbing of Modern City Buildings" (9G5), by Wm. Paul Gerhard, for information on Domestic Water Supply, The Water Supply of Large Modern Buildings, and other data.
24. See Chapter IX on Water Supply Systems in "Mechanical Equipment of School Buildings," (9G8), H. L. Alt.
25. "The Sanitation, Water Supply and Sewage Disposal of Country Houses" (9G7), Wm. Paul Gerhard, dwells upon the sources of water, various modes of raising and storing water and its distribution, and gives detailed advice on how to obtain a satisfactory water-supply.
26. See "Architects' & Builders' Pocket Book" (9G9), F. E. Kidder, for information on Private Water Supply Pumps, Construction of Cylindrical Wooden Tanks, Capacity of Tanks, Windmills, Fire Streams.
27. "Domestic Sanitation and Plumbing" (9G13), A. H. Shaw, contains water supply information in Part II.
28. "Sanitary Plumbing and Drainage" (9G12), J. W. Hart, contains a section on water supply.
29. See *Journal of the Society of Constructors of Federal Buildings*, November, 1915, pp. 336–338, for Paper No. 196, entitled "An Experience with House Water Supply Piping," by Harry G. Richey.
30. See "I.C.S. Plumbers' and Fitters' Handbook," (8G23), section on "Water Supply and Distribution" for information on Sizes of Street Service Pipes Suction Lifts, Sizes of Wooden Tanks, Size of Water Pipes in Building, and Air Locks in Water Pipes.
31. For Tables of Capacity of Rectangular Tanks, Cylindrical Tanks, Cisterns, etc., see "I.C.S. Building Trades' Handbooks," pp. 399, 400.
32. "Hydraulic Tables," Gardener S. Williams and Allen Hazen. 104 pp. Included in the contents are: Observations of Flow in Cast-iron, Riveted Steel, Wooden-Stave, Rectangular Wooden, Cement, Wrought-iron, Galvanized-iron, Brass, Lead, and Glass Pipe, Fire-hose, Open Conduits, Aqueducts, Brick Sewers, and Canals.
33. "Flow of Water," L. Schmeer. 134 pp., illus. A new theory on the motion of water under pressure and in open conduits, and its industrial application.
34. "Water Pipe and Sewer Discharge Diagrams" (with tables and charts), T. C. Ekin. These give the discharges in cubic feet per minute of every inch diameter of pipe from 3 to 48 inches. Velocity curves are shown on the diagrams.
35. "Crosby-Fiske Handbook of Fire Protection" contains tables on the Flow of Water in Pipes, Capacity of Full Smooth Pipes, Friction of Water in Pipes, Capacity of Wrought Iron Pipe.
36. "Water Hammer in Hydraulic Pipe Lines," A. H. Gibson. 68 pp. illus.
37. For "Water Pipe Calculations" see "Lefax" Data Sheet 3–5, by J. W. Ledoux.
38. See "The Hydraulic Ram," "Lefax" Data Sheet 7–83. 4 pp. compiled by T. M. Lane, with diagrams.
39. For "Windmills," see "Mechanical Engineers' Pocket Book," William Kent, 1916, pp. 627–632. Gives information on Power and Efficiency, Capacity and Economy of the Windmill, with tables.
40. For "Windmills," see "Mechanical Engineers' Handbook," Lionel S. Marks, 1916, pp. 864–865. Gives two tables and important references on the subject.
41. For "Water Wheels," see "Mechanical Engineers' Handbook," Lionel S. Marks, 1916, pp. 1070–1071. Contains diagrammatic illustrations.
42. N.F.P.A. "Index" (3A3*i*5) contains references to information on Cast Iron Coated Water Pipes and Cast Iron Water Mains.
43. The Associated Factory Mutual Fire Insurance Companies have issued: "Laying Cast Iron Water Pipes in Factory Yards—Rules" (3A7*a*17).
44. The New England Water Works Association issues:
    (*a*) Standard Specifications for Cast-Iron Pipe and Special Castings (9B3*b*2). Adopted September 10, 1902. (See 46 below.)
45. The American Water Works Association issues the following:
    (*a*) Standard Specifications for Cast Iron Water Pipe and Special Castings (9B3*a*2), adopted May 12, 1908.
    (*b*) Standard Specifications for Hydrants and Valves (9B3*a*3), adopted June 24, 1913; revised June 9, 1916. (See 46 below.)
46. NOTE.—Committees of the two Water Works Associations and of the Manufacturers' Association have been working for some time in the endeavor to harmonize the differences between the standard specifications above referred to.
47. The Standard Specifications for cast iron pipe and special castings (Serial Designation A44–04) of the A.S.T.M. were adopted November 15, 1904, and therefore antedate those of the American Water Works Association.

    These two Standard Specifications, while entirely independent, are identical for practical purposes, for while the highpressure pipe feature of the A.W.W.A. specifications is of interest to water works officers generally, only the larger communities install such systems.

    The whole question of Standard Specifications for water pipe and fittings is closely connected with world trade, and hence the export feature is bound to come to the front more and more. Even the present specifications, nearly identical as they are, should be considered only as fundamental to the international specifications of the future. A very considerable step has been taken in this direction by the International Association for Testing Materials, which has before it at the present time a proposed standard for export use—each pipe-making country of the world retaining its own specifications but all uniting on the international proposal, if found acceptable and workable, for the good of international trade relations.

9E Filtration and Water Treatments

The subject of water purification is covered in the foregoing principal division but the following are listed separately for their special interest in this connection.

1. "Clean Water and How to Get It," Allen Hazen. 196 pp., illus. Treats of: The Action of Water on Iron Pipes and the Effect Thereof on the Quality of Water, Red-water Troubles, Development of Water Purification in America, Storage of Filtered Water, The Required Sizes of Filters and Other Parts of Water Works, Measurement of Water.
2. "Value of Pure Water," Geo. C. Whipple. 84 pp. Included in the Contents are: Benefits of Filtration, Water-softening, Cost of Filtration, The Disadvantages of Hard Water, Use of Hard Water in the Household, in the Industries, and in Steam Making, Financial Loss from the Use of Hard Boiler Water.
3. "Waterworks Handbook" (9D9), A. D. Flinn, contains information on Equipment for Treating Water, Water Softening, and Filtration.
4. "Elements of Sanitary Engineering (9L15), M. Merriman, contains information on Water and Its Purification, Water Filtration at Philadelphia, and Water Filtration at Little Falls, N. J.
5. "Water Works for Small Cities and Towns" (9D11), John Goodell, contains a section on "Clarification and Purification of Water."
6. "American Civil Engineers' Pocket Book" (9G22), Mansfield Merriman, pp. 927–942: Section on "Purification of Water" treats of Auxiliary Methods, Sedimentation, Sand for Filters, Sand Ejectors, Mechanical Filters, and Results of Filtration.
7. See "I.C.S. Plumbers' and Fitters' Handbook," section on "Water Supply and Distribution" (9D30) for information on water Filtration.
8. See "Mechanical Engineers' Pocket Book," 1916, Wm. Kent, for section on "Purifying Feed-Water for Steam Boilers," pp. 723, 724.
9. See "Architects' & Builders' Pocket Book" (9G9), F. E. Kidder, for brief information on Filters and Softening Hard Water for Domestic Use.
10. See Adopted Report of Committee on Water Service, published in Manual of the American Railway Engineering Association (1A9*c*), pp. 443–464, for
    (*a*) Quality of water, methods of treatment, and results obtained therefrom.
    (*b*) Efficiency of water-softeners.
    (*c*) General principles of water-supply service.
    (*d*) General specification for steel water and oil tanks (requiring plates not more than ¼ inch thick).
11. See reference to the Report of Committee on Filter Standardization A.S.M.E. under 9D5.
12. See "Water Purification and Sewage Disposal," J. Tillmans, described under 9D17.
13. For further descriptive matter and illustrations pertaining to subjects covered by this heading, see the following pages in the Industrial Section:
    (*a*) "Clean, safe, freshly filtered Water," Loomis-Manning Filter Distributing Co., p. XVIII.

9F Heating and Cooling of Water

The same note as made under 9E as to these subjects being also covered in the main division 9D applies here. The heating of water by gas was fully treated in the July Journal under subdivision 7K.

The cooling of water applies chiefly to drinking-water systems which are herein referred to independently of the general subject of refrigeration, with which it is closely

connected and which will be referred to under a separate heading in the October Journal, Serial No. 10.

1. "Mechanical Equipment of Federal Buildings," Chapter IV (9G1), contains a division on "Refrigeration," which treats of Systems, Cooling Tanks, Cooling Coils, Circulating Pump, Circulating Lines, Drinking-Water Fountains and Faucets, Methods of Calculation, and Amount of Water Circulated. In addition to various tables, an example of the actual figures used in estimating a plant in one of the larger buildings is given.
   Included in the above Chapter is a typical Specification for a Drinking-Water System, which is the uniform type used by the Supervising Architect's office.
2. In "Mechanical Equipment of Federal Buildings," pp. 134, 135, is information on Exhaust and Live Steam Heaters for heating of water, and on pp. 159–161 are data on heating of water by gas and by coal for storage and circulating systems with calculations for the number of outlets and fixtures.
3. "Inexpensive Plumbing for Farm Kitchens," W. E. Etherton, Professor of Rural Architecture, Extension Bulletin No. 9, April, 1916, Kansas State Agricultural College. 23 pp. Describes and illustrates a unique arrangement for securing hot and cold water from a kitchen range boiler with the use of a hand-pump at the fixture.
4. "Hot Water Circulation," R. M. Starbuck. Illus. A set of 50 blue-prints showing range boiler connections and hot-water circulation put in under all possible conditions. Full notes and suggestions accompany each print.
5. See "Architects' & Builders' Pocket Book" (9G9), F. E. Kidder, for information on Instantaneous Water-Heaters, An Automatic Water Heater, and Heating Water with Steam Coils. Also, see section on "Mechanical Refrigeration" for information on Water and Milk Cooling.
6. See Hutton's "Hot Water Supply and Kitchen Boiler Connections," 211 pp., illus.
7. See Starbuck's "Range Boiler-work, Hot Water Supply, etc.," Vol. II, 160 pp.
8. "Domestic Sanitation and Plumbing" (9L30), A. H. Shaw. Part II, contains information on Domestic Hot-Water Service.
9. See Chapters X and XII on "Hot Water Systems" and "Drinking Water" in "Mechanical Equipment of School Buildings" (9G8), H. L. Alt.
10. See "I.C.S. Plumbers' and Fitters' Handbook," section on "Water Supply and Distribution" (9D30), for table and data on Heat Transmission through Metals to Water, for Standard Sizes of Galvanized Boilers and for Size and Capacity of Hot-Water Supply Tanks.
11. See reference to water heaters and mixers in Technical Paper "Miners Wash and Change Houses" (9J18).
12. See "A Method for Practical Elimination of Corrosion in Hot Water Supply Pipe," paper by F. N. Speller. 1916. 12 pp. Reprinted from the *Journal of the American Society of Heating and Ventilating Engineers*.
13. The U. S. Department of Agriculture has issued Farmers' Bulletin No. 475, "Ice Houses," by L. C. Corbett. 1917. 20 pp. Contains construction diagrams and other illustrations.
14. For further descriptive matter and illustrations pertaining to subjects covered by this heading, see the following pages in the Industrial Section:
   (*a*) Heating of Water by Automatic Gas Water Heater, Humphrey Company, p. xv.
   (*b*) Removal of Discoloration from Hot Water, Loomis-Manning Filter Distributing Co., p. xviii.

9F1 *Standardization of Range Boilers and Others.*

While the Code of the A.S.M.E. (referred to under Serial No. 10) for the "Construction of Steam Boilers and Other Pressure Vessels and for Their Care in Service" covers the manufacture of steel-plate hot-water boilers over 60 inches in diameter, or where the grate area exceeds 10 square feet and the maximum allowable working pressure exceeds 50 pounds per square inch, there appears to be a noticeable lack of uniformity in the gauge of metal and sizes of boilers manufactured for domestic purposes or use in small installations.

The words "standard" and "heavy" are used extensively though the resultant products seem to vary according to various manufacturers' interpretations of these terms.

Realizing the great need of standardization in the range boiler industry in respect to capacities, dimensions, and guarantees, nine manufacturers organized The Range Boiler Exchange, with A. A. Ainsworth, Secretary, 17 Battery Place, New York City, and on March 14, 1916, issued a pamphlet, "Regulations Governing the Sale and Installation of Range Boilers as Adopted by The Range Boiler Exchange." This gives a list of sizes, capacities, and approximate prices of range boilers and expansion tanks, describes standard tappings and guarantees, and gives recommendations for the successful and economical installation of range boilers and expansion tanks.

The State of Massachusetts adopted, as revised to take effect July 2, 1916, Senate Bill No. 395 relative to the capacity, working pressure, and manufacture of range boilers, requiring that all vessels or tanks in which water is to be heated under pressure in the Commonwealth is to have stamped thereon its capacity, the maker's name and guarantee that it has been tested to not less than 200 pounds' pressure to the square inch.

Notwithstanding the above, there is room for improvement in the matter of standardization, so that range boilers, expansion tanks, storage, pneumatic, and other tanks, may be specified with an exactness that will secure equable conditions in estimating and the installation of the article intended.

9G Plumbing Installations in General

Under this heading will be placed those reference works and other publications which cover the whole subject fully. For convenience many of them, or sections from them, will be found mentioned also under the various subdivisions wherever the references are especially applicable or significant.

The subject of Piping Buildings for Gas, usually associated with plumbing installations, was treated under Serial No. 7 in the July issue of the Journal.

1. "Mechanical Equipment of Federal Buildings" (6L1), pp. 137–193. Chapter IV on "Plumbing, Drainage, and Water Supply" contains much valuable data and many tables and recommendations for plumbing installations, also a Report of Committee on Toilet Regulations for Industrial Plants (9H5).
   It also contains several pages of very complete "Itemized Estimating Data" for fixtures, fittings, piping and all features of a plumbing installation.
2. "Mechanical Equipment of Federal Buildings," Chapter IV, also contains a section on "Tests of Plumbing and Drainage System," which treats of Water, Air, and Smoke Tests, Test of Water-Supply System, Cost of Tests, and Certificate.
3. In "Mechanical Equipment of Federal Buildings" will also be found the following information: p. 383, Table of Standard Dimensions of Wrought Iron and Steel, Steam, Gas and Water Pipe; p. 388, Table giving Velocity of flow of water in feet per minute, through pipes of various sizes, for Varying Quantities of Flow; p. 389, Table giving Loss in Pressure Due to Friction in Pounds, per Square Inch, for Pipe 100 Feet Long; p. 392, Table of Pressure in Inches of Water; p. 392, Table of Pressure in Ounces per Square Inch, and, p. 397, Table of Weights of Galvanized Iron Pipe per Lineal Foot.
4. "Sanitation of Public Buildings," Wm. Paul Gerhard. 262 pp.
   Part I deals with Hospital Sanitation including: Disinfecting Station, Garbage Disposal, Bibliography.
   Part II: Theater Sanitation, Ventilation, Lighting, Bibliography.
   Part III: Church Sanitation, Precautions against Fire and Panic, Seating, Dust, Lighting, Heating, Ventilation, Plumbing, Bibliography.
   Part IV: School Sanitation—Heating and Ventilation, Lighting, Fire Protection, Sanitary Arrangements, School Baths, Bibliography.
   Part V: Sanitation of Markets and Abattoirs—Interior features, Equipment, Ventilation, Lighting, Removal of Waste Food, Sanitary Features, Mechanical Equipment, Bibliography, Appendices.
5. "Water Supply, Sewerage, and Plumbing of Modern City Buildings," Wm. Paul Gerhard. 491 pp., illus. Contents include: The Essential Features of the Hydraulic and Sanitary Engineering of Buildings; The Maintenance of Pipe Systems for Sewage, Gas, and Water; Rules on Plumbing, Water Supply, and Sewerage of Hospitals and other Public Institutions; Definitions; and Plumbing Specifications Reminder.
6. "Sanitary Engineering of Buildings," Wm. Paul Gerhard. Illus. I. Defective Plumbing and Sewer Gas. II. Traps and Systems of Trapping. III. Sewerage of Buildings. IV. Plumbing Fixtures. V. Sewage Removal and Sewage Disposal. VI. The Leading Principles of House Drainage and Sanitary Plumbing. VII. Improved Methods of House Drainage. VIII. The Proper Arrangement of Water-Closet and Bath Apartments. IX. A Plea for Sanitation in Factories and Workshops. X. The Sanitary Drainage of Tenement Houses. XI. On Testing House Drains and Plumbing Work. XII. Simplified Plumbing Methods.
7. "The Sanitation, Water Supply and Sewage Disposal of Country Houses," Wm. Paul Gerhard. 348 pp., illus. General sanitation of country houses, relation of the soil, subsoil, surface drainage, aspect, surroundings, lighting, heating, ventilation, water-supply, sewage, etc., to a healthful home.

8. "Mechanical Equipment of School Buildings," Harold L. Alt. 112 pp., illus. Contains Chapters as follows (other Chapters referred to elsewhere): V. Toilet Fixtures. VI. Plumbing Fixtures. VII. Number and Location of Fixtures. VIII. Toilet Partitions and Shower-Baths. IX. Water-Supply Systems. X. Hot-Water Systems. XI. Fire Protection. XII. Drinking Water. XIII. Sewage Disposal.
9. See "Architects' & Builders' Pocket Book," 1916, F. E. Kidder. Contains a section on "Hydraulics, Plumbing and Drainage, Gas and Gas-Piping" (pp. 1295–1350), by J. J. Cosgrove, which treats of Hydraulics, Private Water Supply, Pumps, Windmills, Fire-Streams, Construction of Cylindrical Wooden Tanks, Capacity of Tanks, Plumbing Definitions and Requirements, Plumbing Materials and Details, Testing of Plumbing Systems, Plumbing Specialties, Symbols for Plumbing. Includes numerous tables and diagrams.
10. "How to Drain a House," G. E. Waring. 229 pp. Third edition enlarged. Illus. Contains practical information for householders on Drains, Foundation and Cellar, Sewer Gas, Fresh Air Inlets, Soil Pipe, Traps and trap Ventilation, Plumbing Appliances, and Sewage Disposal.
11. "Modern Sanitary Engineering," Thomson Gilbert. 283 pp., illus. Part I: "House Drainage." Contents include considerations of the Site and Surroundings of the House, General Principles of Drainage Design, Materials and Size of Drains; Traps—Their Principle, Efficacy, Number, Position and Ventilation, Fixtures and Fittings, Designing a System of Drainage, Buildings of Special Class, Sewage Disposal for Isolated Houses.
12. "Sanitary Plumbing and Drainage," J. W. Hart. 253 pp., illus. Contents include: Sanitary Surveys, Sanitary Defects, Water Supply, Town House Sanitary Arrangements.
13. "Domestic Sanitation and Plumbing," in two parts, A. Herring-Shaw.
    Part I: Materials and Their Uses. 334 pp. illus.
    Part II: Water Supply, Domestic Hot-Water Services, Warming and Ventilation of Buildings. 374 pp., illus.
14. "Standard Practical Plumbing" Vols. I and II, J. P. Davies. A complete encyclopædia for practical plumbers and guide for architects, builders, gas-fitters, hot-water fitters, sanitary engineers, and others. Contains numerous engravings.
15. "The Building Foreman's Pocket Book and Ready Reference," H. G. Richey, 1118 pp., illus. Contents include data on Boilers, Water, Sewers, Soil and Vent Pipes, and miscellaneous plumbing information.
16. "A Handbook for Superintendents of Construction, Architects, Builders and Building Inspectors," H. G. Richey.
17. "The Mechanics' Ready Reference," H. G. Richey. Prepared for each trade.
18. "The New Building Estimator," William Arthur. 1913. Part II contains a section on "Plumbing and Gas Fitting."
19. "Plumbing Practice" Vol. 1, J. W. Clarke and Walter. 297 pp., illus. Practical lead-working and plumbers' materials described.
20. "Mechanical Engineers' Handbook," 1916, Lionel S. Marks Section on "Pipe and Pipe Fittings," pp. 790–842, contain. information on Cast-Iron, Wrought-Iron, and Steel Pipe; Pipes and Tubes of Copper, Brass, Lead, Tin and Aluminum; Vitrified, Wooden-Stave and Concrete Pipe; Fittings for Wrought-Iron and Steel Pipe; Valves; Pipe Supports; Pipe Coverings; numerous diagrammatic illustrations and tables of sizes and weights.
21. See "Civil Engineers' Pocket Book," 1913, J. C. Trautwine, pp. 649–688. Contains sections on Consumption, Use and Waste, Reservoirs, Service Pipes, Anti-bursting Device, and Fire Hydrants. Also contains section on "Water Pipes," which treats of Prevention of Concretions in Water Pipes, Gives Weights of Cast and Wrought Iron Pipes, Wooden and Other Pipes, Costs of Pipes and Laying, Repairs and Connections.
22. See "American Civil Engineers' Pocket Book," 1916, Mansfield Merriman, pp. 913–1022.
    Also (pp. 395–397), contains tables of Standard Pipe, Standard Pipe Fittings, Flanges.
23. See "I.C.S. Plumbers' and Fitters' Handbook," section on "House-Drainage System," which gives Drainage System Details; Least Sizes of Soil, Waste, and Vent Pipes; Sizes of Traps and Back Vents and data on Testing Plumbing by Water, Air and Smoke. Also see pp. 261–375, for Plumbing Materials and Fixtures, Drainage and Sewerage, Water Supply and Distribution, and other useful information for plumbers and others.
24. See "I.C.S. Building Trades Handbook," section on "Plumbing."
25. See "I.C.S. Mechanics' Handbook" for information on Sizes and Weights of Pipe, Standard Dimensions, and Cylinders.
26. The above I.C.S. handbooks are independent of two volumes on "Refrigeration" and two volumes on "Plumbing and Gas-Fitting" in the extensive International Library of Technology, each of which treats the subject exhaustively.
27. See Gray's "Plumbing, Design and Installation" 560 pp., illus.
28. See Hutton's "Country Plumbing Practice," 310 pp., illus.
29. See "Standard Practical Plumbing," R. M. Starbuck.
30. "American Sanitary Plumbing," J. J. Lawler. 320 pp., illus. For plumbers, steam fitters, architects, builders, apprentices and householders.
31. "Sanitary House Drainage: Its Principles and Practice," H. Coleman. 186 pp. A manual for architects.
32. "Treatise on Water Supply, Drainage and Sanitary Appliances of Residences," F. Colyer. 92 pp.
33. For papers and lectures in connection with materials, methods, and devices used in plumbing installations, see the Index to the Library of the Franklin Institute, of the state of Pennsylvania.
34. See Index to "Lefax Data Sheets," classification (1) Civil, and (2) Mechanical, for topics of interest.
35. "External Plumbing Work, J. W. Hart. Second edition. 280 pp., illus. A treatise on leadwork for roofs.
36. See "A Plea for Strict Plumbing Codes" by Dr. Wm. Paul Gerhard. reprinted by courtesy of *The Sanitary Engineer* of Toronto in "Sanitary Pottery" for July and August, 1917.
37. The U. S. Department of Agriculture Office of Experiment Stations, A. C. True, Director, has issued Farmers' Bulletin No. 270, "Modern Conveniences for the Farm Home," by Elmina T. Wilson. 1916. 48 pp. Contains a treatise on the water-supply, all features of plumbing in the house, earth closets, disposal of waste-water and sewage, of ashes, garbage and miscellaneous refuse.
38. The Specifications for Construction of a Standard Building of the N.F.P.A. (3A3*d*31) state, "The lowest floor of the building shall be drained to a sump chamber, which is provided with adequate facilities for removing surplus water therefrom."
39. "The Prevention of Corrosion in Pipe," paper by F. N. Speller. 15 pp. Contains illustrations, diagrams, and tables. Reprinted from the *Journal of the American Society of Heating and Ventilating Engineers*.
40. See publication of the N.F.P.A. entitled, "Frozen Water-Pipes: A Winter Hazard" (3A3*f*6).
41. N.F.P.A. "Index" (3A3*f*5) contains references to information on Pipe and Standardization of Pipe and Pipe Fittings.
42. See "Building Code" recommended by the N.B. of F.U., 1915, pp. 225–229. Contains sections on "Plumbing," "Drainage" and "Electrical Requirements."
43. "The Superintendence of Piping Installations in Buildings—Sanitary, Hydraulic and Gas." William Paul Gerhard, C. E. 85 pp. A manual intended for the use of practising architectural superintendents, plumbing and health inspectors and all interested in the installation of piping systems. Contents include: Sewer, Water, and Gas Connections; Rough Work; Soil, Waste, Vent and Leader Systems and Drains; Water Pipes, Tanks, Meters, Boilers, Hot-Water Tanks, Pumps, etc.; Roughing for Plumbing Fixtures; Setting the Plumbing Fixtures; Turning on the Water and Gas; Tests of the Work; Records and Plans.
44. For further descriptive matter and illustrations pertaining to subjects covered by this heading, see the following pages in the Industrial Section:
    (*a*) "An Investigation of Pipe Corrosion in 125 Apartment Buildings," A. M. Byers Co., p. xiii.
    (*b*) "Crane Drainage Fittings," Crane Co., p. xix.
    (*c*) Cast Iron Soil Pipe Mfrg. Asso., p. xxi.
    (*d*) "White China Pipe Escutcheons," The Fairfacts Co., p. x.

9Ca *Separate Letting of Contracts*

A committee of the American Institute of Architects, known as the Committee on Conference with the National Association of Master Plumbers and the National Association of Master Steam and Hot Water Fitters, held meetings with the joint committee representing those two organizations in 1913. As a result of such conference the Committee recommended to the American Institute of Architects the adoption of the following Resolution, which was formally adopted by the Convention of 1913 at New Orleans:

"*Resolved*, That the American Institute of Architects, in convention assembled, recommends to the members of our profession the adoption of the practice of direct letting of contracts for mechanical equipment, such as heating apparatus, plumbing, and electrical equipment. This recommendation is based on the conviction that direct letting of contracts, as compared with subletting through general contractors, affords the architect more certain selection of competent contractors and more efficient control of execution of work, and thereby insures a higher standard of work, and, at the same time, serves more equitably the financial interests of both owner and contractor."

9Cb *Notes on Standardization of Cast-Iron Soil Pipe and Fittings*

From a paper by Harry Y. Carson

For years, in fact since the New York City Plumbing Code of 1881, there have been specifications and requirements in all plumbing regulations governing the weight

and wall thickness of soil pipe; but there have been no such specifications, until recently, which regulate soil-pipe fittings.

It is almost impossible in foundry practice to prevent a variation in individual pieces of as much as $\frac{1}{16}$ inch, and with the class of pipe known as "standard" calling for a wall thickness of but $\frac{1}{8}$ inch, when we consider this possible variation, we are confronted with the very real danger which must exist in pipe having a wall thickness at any point of $\frac{1}{16}$ inch.

In the casting of extra-heavy pipe with a wall thickness of $\frac{1}{4}$ inch, while the same variation is both possible and permissible, the factor of safety is far greater, for the wall of the pipe should not, with the observance of high standards in foundry practice, be less than $\frac{1}{16}$ inch—ample protection against leakage in the finished stack. That the leakage of gases of every nature is considered harmful is evidenced by the regulations adopted by all cities with respect to the test which must be applied to all plumbing prior to its approval by the plumbing inspectors, and it is not only sewer gas which may escape through the use of light wall pipe, but illuminating gas which enters the sewers through leaks in the gas mains.

That a specification for soil-pipe fittings, regulating not alone the weight of each fitting but its wall thickness, radii of bends, calking room, depth and thickness of hubs, and other essential dimensions, has long been needed is manifest by the efforts that have been made and the able work that has been accomplished in this direction during the past six years. A very desirable standard for soil pipe and fittings is now in existence, and it is being adopted in the larger cities of the United States. This standard is known as the "Naco" specification for soil pipe and fittings.

In 1911 a committee made up of sanitary engineers, jobbers of plumbing supplies, plumbing inspectors, and others familiar with trade conditions were delegated to report on this subject to the American Society of Sanitary Engineering.

A report of the Committee on Organization and Functions of Municipal Health Departments given in the Public Health Officials' Section of the American Public Association, Jacksonville, Fla., December 2, 1914, as reported on page 1258 of Vol. V (December, 1915) *American Journal of Public Health*, states:

"The lack of standardization appears in the requirements for some of the commonest fittings. We have noted variations in the weights required for soil pipe when called for under specific names, such as standard, medium, and extra heavy. While in soil pipe itself the variations noted were not great, yet in the fittings which go with the pipe and form an essential part of the drainage lines we find a complete absence of control except in a few of the codes of very recent date where notice has been taken of this omission from previous codes and the defect corrected. To illustrate, we have computed the per cent. variations of the weights given for some of the quite common fittings which were purchased on the open market and weighed by investigators of this form of plumbing supplies." (See Table on page 1259, *American Journal of Public Health*, December, 1915.)

The Committee of Health Officials further reported:

"This variation may have been due to variation in length of fittings as well as to variation in thickness of shell, but members of your Committee have personally examined some such fittings which had a thickness of shell of less than $\frac{1}{16}$ inch on one side and a scant $\frac{1}{8}$ inch on the other."

That no manufacturer had, prior to 1911, adopted any fixed standard for making up soil-pipe fittings is apparent from the table shown in the report. In fact, there are many instances where patterns become so confused that fittings marked "extra heavy" are actually of lighter weight than those marked "standard."

A study made of plumbing codes from some 200 of the leading cities in the United States revealed the fact that no attempt had as yet been made by boards of health or other proper authorities to regulate the dimensions and weights of soil-pipe fittings. It was therefore only natural that the chaotic condition shown by the above table should exist. A chief reason for the lack of standardization has been that under the highly competitive conditions in the soil-pipe business this situation has resulted in the marketing of fittings of the *lightest possible weight*. Such fittings are necessarily fundamentally weak, of bad design, and a practice permitting this, while it demands pipe of $\frac{1}{4}$ inch wall thickness, is ridiculously inconsistent. The stack is no safer and no more sanitary than the lightest and weakest fitting.

At the present writing it can be stated that all necessary progress has been made in creating the standard of weights and dimensions for extra-heavy soil-pipe fittings, so that now fittings can be furnished of such proportions as to correspond to the wall thickness and strength of extra-heavy pipe; yet, there persists today a lax attitude in many of our cities with regard to the advantages to sanitation and economy that follow the adoption of this standard. On the other hand, some of the larger and more progressive communities, such as Cleveland, Ohio, Portland, Ore., and the state of Wisconsin have not been slow to see those very real advantages which do come. Consequently these localities have passed laws that are now in effect and require that the extra-heavy fittings shall conform to the Naco specifications.

Recognizing that such inertia persists in many of our municipal governments, the American Society of Sanitary Engineering prepared and adopted, at its 1914 convention in Minneapolis, Minn., a resolution for the attention of those who influence plumbing and sanitary legislation. This resolution, as it appears in the Annual Proceedings of the Society, reads as follows:

WHEREAS, The National Committee of Confederated Supply Associations, representing the various associations of plumbing supply dealers, adopted, July 11, 1912, specifications called Naco specifications for the standardization of extra-heavy soil pipe and fittings, and

WHEREAS, Since these specifications do not conflict with the specifications and drawings already recommended by this Society, and represent a simple working basis for the establishment of a standard for extra-heavy pipe and fittings, therefore be it

Resolved, That Naco specifications be adopted by this Society as its standard for extra-heavy pipe, and that it be further

Resolved, That the Society, through its members, use their best efforts toward the adoption of this standard in the plumbing regulations of municipalities where they have influence, and also assist in the extension of the use of such pipe and fittings which comply with the standard hereby adopted.

The term Naco has been given to the specification as an identification motto, and this motto in reality accredits and honors the name of the National Committee of Confederated Supply Associations, they having been the prime movers in securing data for the ultimate specification adopted.

Committee A-3 of the American Society for Testing Materials, a Society which is working for the standardizing of all engineering materials, is giving the Naco specification equal prominence with the well-known standard specification of cast-iron water and gas pipe which came originally from the American and New England Water Works Association.

9H Fixtures and Fittings

1. In its work on the technology of clays, the U. S. Bureau of Mines has issued:
   (*a*) Bulletin No. 53, "Mining and Treatment of Feldspar and Kaolin in the Southern Appalachian Region."
   (*b*) Bulletin No. 92, "Feldspars of the New England and Northern Appalachian States."
   (*c*) Technical Paper No. 99, "Probable Effect of the War in Europe on the Ceramic Industries of the United States."
   (*d*) A report on the purification of the Georgia kaolins, setting forth how this American product may be substituted for imported clays in the making of porcelain, etc., will be issued shortly.
2. Among the numerous publications of the U. S. Bureau of Standards, the following are of interest concerning fixtures and fittings:
   (*a*) "Annual Report of the Director," 1916 (1A2*a*), contains the following regarding enameled iron: "Work has been undertaken upon the study of enamels for cast iron and steel. It was first necessary to secure proficiency in the proper treatment of metal and the application and fusion of the ground coats and enamel. A number of excellent undercoatings and enamels have been developed, both for cast iron and steel. A study of enamels possessing maximum resistance to solution is under way."
   (*b*) Circular No. 45, "The Testing of Materials," gives requisite information (pp. 40, 41) on sewer pipes and drain tiles made of hard burnt clay; also, porcelain and white ware manufactured from white burning mixtures of kaolin, ball clay, feldspar, and flint.
   (*c*) Other circulars and technologic papers, specific information about which will be furnished through the Journal, or copies of which may be had upon application to the Director, as noted under 1A2*b*.
3. The U. S. Geological Survey has issued:
   (*a*) A chapter on "Mineral Resources of the U. S." (2A1*d*), entitled "Clay Working Industries and Building Operations in the Larger Cities," a section of which is devoted to "Pottery."
   (*b*) A large number of bulletins and separate chapters (2A1*d* and *g*) dealing with clays, iron, and other materials entering into the manufacture of plumbing fixtures and of other plumbing materials. Specific information will be furnished through the Journal, or the publications may be had upon application to the Director, as noted under 2A1.
4. For detailed drawings and descriptions of all kinds of plumbing fixtures used as "standard" in Government installations, see "Specifications for Plumbing Fixtures, etc., for the Treasury, War and Navy Departments," mentioned under 9A1 and described on p. 146 of "Mechanical Equipment of Federal Buildings under Control of the Treasury Department" (9G1), in which it is said: "The board which prepared this specification has produced a document remarkable for both scope and accuracy, and has rendered a substantial service to sanitary engineers and to the manufacturers in this line of business. Engineers and architects who have had to hear and weigh the claims and counter claims of representatives of various plumbing-material houses will undoubtedly appreciate the relief which the standardization brings."
5. "Mechanical Equipment of Federal Buildings," Chapter IV 9G1), contains "Report of Committee on Toilet Regulations for Industrial Plants." This Committee was appointed by the Chairman of the Sanitary Section of the Boston Society of Civil Engineers to consider the regulations for toilet facilities in industrial establishments, and its report contains valuable basic data upon the subject of proportioning plumbing fixtures to occupants of buildings.
6. "The Development of the Ceramic Industries in the United States," A. V. Bleininger, Ceramic Chemist, Bureau of Standards, Pittsburgh, Pa. An address delivered before the Franklin Institute, November 2, 1916.
7. See *Journal of the Society of Constructors of Federal Buildings*, March, 1915, pp. 160–164, for address by Mr. T. Nelson Kise on "Vitreous China Plumbing Fixtures" and discussion which followed.
8. For developments in the art of ceramics, which include the manufacture of porcelain and vitreous ware plumbing fixtures, see the publications of the American Ceramic Society, listed under 3C1, including "A Bibliography of Clays and the Ceramic Arts" (3C1*b*).
9. "Water-Closets," Glenn Brown, Architect. A Historical, Mechanical, and Sanitary Treatise. Contains over 250 engravings, drawn expressly for the work by the author. The descriptions are particularly full and thorough.
10. See "Sanitary Engineering of Buildings" (9L24), W. P. Gerhard, for information on Plumbing Fixtures, and The Proper Arrangement of Water-Closet and Bath Apartments.
11. In "Mechanical Equipment of School Buildings" (9G8), by H. L. Alt, note Chapters V, VI, VII, and VIII, as of interest in connection with fixtures and fittings.
12. "Modern Sanitary Engineering" (9L29), Thomson Gilbert, contains information regarding Water-Closets, Flushing Cisterns and Pipes, Urinals, Baths, Lavatory Basins, Sinks, Tubs, and other fixtures.
13. "Sanitary Plumbing and Drainage" (9G12), J. W. Hart, contains data on Baths and Fittings, Lavatories, Sinks, and other fixtures.
14. "How to Drain a House" (9G10), G. E. Waring, treats of Plumbing Appliances, Wash-Stands, Water-Closets, Sinks, and other fixtures.
15. "The Building Estimator's Reference Book," 1917, Frank R. Walker: Section on "Plumbing, Sewerage and Gas Fitting," pp. 3100–3115, gives information regarding the size and cost of all plumbing fixtures.
16. "I.C.S. Plumbers' and Fitters' Handbook" (9G23): Section on "Plumbing Fixtures" gives information on Baths, Dimensions of Baths and Foot-Baths, Wash-Basins, Water-Closets, Urinals, Sinks, Laundry Tubs, and Swimming-Pools.
17. "I.C.S. Building Trades' Handbook" (9G24) gives information and tables on the sizes of fixtures.
18. See reports of committees of the American Institute of Metals and of the National Association of Brass Manufacturers on standardization of metal plumbing accessories.
19. For further descriptive matter and illustrations pertaining to subjects covered by this heading, see the following pages in the Industrial Section:
   (*a*) Kohler Enameled Ware Tubs, Lavatories and Sinks, Kohler Co., pp. xvi–xvii.
   (*b*) "Impervio" Vitreous China and "Ideal" Solid Porcelain Tubs, Lavatories and Water-closets, The Trenton Potteries Co., p. xi.
   (*c*) "Pembroke" Built-in Baths, Standard Sanitary Mfg. Co., p. xii.

9H1 *Bathroom and Laundry Finishes and Accessories.*

Of much interest in connection with plumbing installations is the finish of the walls and floors in any bathroom, toilet, and other place given over to similar use.

The extensive use of tile for this purpose makes it desirable to call attention to the information pertaining to the service and products of the Associated Tile Manufacturers contained on page xiv of the Industrial Section.

Information concerning marble and slate will be found in the February issue under 2F and 2K.

For illustrations and descriptions of various "Biltin" china bathroom accessories such as towel-bars, soap-holders, and many others, see page x in the Industrial Section—The Fairfacts Company.

As of interest in connection with laundry installations, see information pertaining to Glass Enameled Steel Laundry Chute, on page xxxix, in the Industrial Section by The Pfaudler Co.

9J Swimming-Pools, Baths, Bath and Change Houses

1. The Bureau of Mines has issued:
   (*a*) Technical Paper No. 33, "Sanitation at Mining Villages in the Birmingham District, Ala." (9L1*a*), which contains a brief section on "Bath and Change House."
   (*b*) Technical Paper No. 116, "Miners' Wash and Change Houses," J. H. White, 1915, 23 pp. Contains information on the advantages of wash and change house; extent of installations; comparative inexpensiveness; location of building; artificial lighting and heating; drying arrangements; lockers; shower baths preferable to bathtubs; water-mixers and -heaters; number and construction of shower-booths; swimming-pools; quality and quantity of water required; public laundries; plumbing. Contains illustrations, plans, sections and details of wash and change houses. Price, 10 cents.
   (*c*) Bulletin No. 87, "Houses for Mining Towns" (8L1*c*), contains information and one illustration regarding the "Wash and Change House."

   A number of wash and change houses have been described in various mining magazines and other publications, and some of the recommendations contained in the publication described under 8J1*b* are based on information derived from these descriptions. Some of these references are given in the list following:
2. "Miners' Change and Bath House," A. F. Allard, *Coal Age*, Vol. 3, January, 1913, pp. 115–116, describes bath house at coal-mine near Clinton, Ind.

3. Bulletin No. 7 of the American Iron and Steel Institute, Vol. 1, July, 1913.
4. "Report of Committee Appointed by Illinois Coal Operators' Association to Draw up Standards for Wash and Change Houses," *Black Diamond*, Vol. 52, November, 1914, 363 pp.
5. "Miners' Baths," H. F. Bulman and W. B. Wilson, *Coal Age*, Vol. 2, November, 1912, pp. 619–620. Discusses bath houses in Europe; also in Coll. Eng., Vol. 35, October, 1914, pp. 140–143. Describes construction and use of bath-houses in England and on the Continent.
6. "European Wash House Practice," *Coal Age*, Vol. 11, January, 1912, pp. 502–505; February, pp. 538–540, 573, 574. Discusses in detail wash houses at European mines.
7. "Suggestions for New Zealand Mines," *Coal Age*, Vol. 2, September, 1912, pp. 397, 398. Describes bath house recommended by New Zealand Royal Commission on Mines.
8. "Bath House at Shamokin, Pa," *Colliery Engineer*, Vol. 33, July, 1913, pp. 679, 680.
9. "Welfare Work of a Coal Company," *Colliery Engineer*, Vol. 34, March, 1914, pp. 497, 498. Describes bath house at anthracite mine in Pennsylvania.
10. Report of the Departmental Committee of the Committee on Provisions for Washing and Drying at Mines, appointed by the Secretary of State for the Home Department of Great Britain to consider the provision of washing and drying accommodations at mines under Section 77 of the Coal Mines Act of 1911.
11. "Wash Houses at Coal-Mines," *Engineering and Mining Journal*, Vol. 83, April, May, 1907, pp. 675, 1012. Short editorials on the advantages of wash and change houses at mines.
12. "Change House at Franklin Furnace, N. J.," *Engineering and Mining Journal*, Vol. 94, August, 1913, pp. 358, 359.
13. "Change House with Novel Features," *Engineering and Mining Journal*, Vol. 97, March, 1914, pp. 521–523. Describes wash and change house at mine in the Menominee Range.
14. "Examples of Modern Sanitary Dry Houses," A. H. Fay, *Engineering and Mining Journal*, Vol. 88, October, 1909, pp. 822–824. Describes bath houses at three Minnesota and Michigan iron properties.
15. "Observation in Coal Mines of Europe," Frank Haas, *Engineering and Mining Journal*, Vol. 89, April, 1910, p. 730. Describes bath house at a German coal-mine.
16. "Wash and Change Houses Abroad," *Iron and Coal Trades Review*, Vol. 83, 1911, pp. 848–850, 866, 887.
17. "Description of Several Wash Houses in England," *Iron and Coal Trades Review*, September, 1914.
18. "A Wash House for Coal Miners," L. Peyton, *Engineering and Mining Journal*, Vol. 91, March, 1911, p. 604. Describes wash house at Benton, Ind.
19. "A Modern Twin Coal-mining Plant," W. R. Roberts, *Coal Age*, Vol. 1, December, 1914, p. 236. Describes bath-house at coal-mine near Danville, Ill.
20. "Change House with Swimming-Pools," A. H. Sawyer, *Engineering and Mining Journal*, Vol. 98, 1914, pp. 483, 484. Describes change house with two pools, one for white and one for colored miners, at Raimund mines, near Bessemer, Ala.
21. "A Change House for Coal Miners," A. A. Steel, *Mines and Minerals*, Vol. 32, June, 1912, pp. 647, 648. Suggests plans for construction and methods of keeping building in order.
22. For "School Baths" see "Sanitation of Public Buildings," W. P. Gerhard (9G4), Part IV.
23. For "Toilet Partitions and Shower Baths in Schools" see "Mechanical Equipment of School Buildings," (9G8.)
24. See reference to Baths and Swimming-Pools in "Plumbers' and Fitters' Handbook," (9H61.)
25. "Modern Baths and Bath Houses," Wm. Paul Gerhard. 311 pp., illus. Contents include: Historical Notes on Bathing; The Different Forms of Baths; The Modern Rain Bath; House and Tenement Baths; Public Bath-Houses; People's Baths; Factory Baths, School Baths; Baths for Military Barracks, Prisons, and Jails; Hospital Baths; Baths for Club Houses, Gymnasia, Hotels and Barber Shops; River and Sea Baths; Air and Sun Baths; Medical and Electric-Light Baths; The Water Supply and Plumbing of Bath-Houses; Bibliography on Baths and Bathing; Appendix—Bathing in Various Countries; The Dog Bath.
26. "Turkish Baths," R. O. Allsop, Architect. Illustrated with plans and sections from scale drawings by the author. Describes the Turkish bath, its design and construction for public and commercial purposes, with chapters on the adaptation of the bath to the private house and institutions.
27. "Baths," R. O. Allsop. 98 pp., illus. Describes public baths and wash houses.
28. "Architects' and Builders' Pocket Book" (9G9), F. E. Kidder, gives information on Plunge Baths and Symbols for Plumbing.
29. For further descriptive matter and illustrations pertaining to subjects covered by this heading, see "Swimming-Pools," a 32-page book, 8½ x 11, with plans, sections, details and photographic illustrations of tiled pools and accessories, copyrighted 1917 by the Associated Tile Manufacturers. (See p. xiv in Industrial Section.)

9K Sprinklers and Fire Protection

References were given in the April Journal, Serial No. 4, under 4F "Fittings, Contents and Protection Equipment" to the publications of the various fire prevention authorities. In addition to those and to the papers, articles, and discussions listed in the N.F.A. Index therein referred to, others on various phases of the subject will be found listed in the indexes of the water works associations and the engineering societies referred to in this issue, and the use of water in connection with fire extinguishment is of course treated in many of the publications listed in this issue under the 8D Division.

The following letter from the Chairman of the Institute Committee on Materials and Methods is printed as of interest in connection with this subject.

9K1 *Concerning Underground Piping for Sprinkler Installations*

July 19, 1917.

To the Structural Service Department of the Journal of the A.I.A.:

I have received from the United Association of Plumbers and Steam Fitters of the United States and Canada a communication addressed to the members of the American Institute of Architects and signed by Mr. John R. Alpine, the General President of this Association. The letter states, among other things, that:

"For many years you have been disturbed because of industrial conflict arising in connection with your building operations, and with which you as architects were not concerned, but which caused you builders, owners, and the public generally much discomfiture and great loss of money because of stoppage of work. The industrial disturbances referred to are commonly known as jurisdictional disputes between trades engaged in the building industry, or, in other words, internecine disputes between building trades, each laying claim to a certain form of work, and one striking against the other in order that control over the work in dispute might be secured.

"For some time past we have been troubled with the question of jurisdiction as concerns the installation of what is known as underground piping, when such underground piping comes in connection with the installation of sprinkler equipments. The United Association of Plumbers, Steam Fitters, Sprinkler Fitters, etc., is granted by the American Federation of Labor trade jurisdiction over all forms of pipe fitting, except conduit piping for electrical purposes, and underground piping of all descriptions comes within the jurisdictional scope of the United Association. We frequently have internal disputes because of the fact that when sprinkler contracts are awarded, underground pipe work, in connection with sprinkler equipments, is frequently awarded separately from the sprinkler contract, and awarded to plumbing and steam-fitting concerns. When it comes time to install this underground work the sprinkler fitter contests the right of the plumber or steam fitter to make the installation, and the plumber or steam fitter maintains his right to do this work because it comes within the contract of his employer.

"Since this is the case, we maintain that neither one has the right to encroach upon the work of the other; yet when a contract embracing work that clearly belongs to one class of men is subdivided, and portions of such contract awarded to another class of men, our task is made exceedingly difficult. Trouble ensues and architects, owners, builders and the public generally are involved as well as the men who are participating in the contest. Of course, ultimately, we dispose of these disputes, but not until much discomfiture and loss has been experienced by all concerned.

"Underground piping herein referred to means cast-iron or wrought iron piping, representing underground mains, branches, etc., from city mains, pumps, reservoirs, tanks, hydrants when in connection with sprinkler equipments, etc., and I am sending this letter to the members of your Association with the hope that you may be helpful in the future in having this class of work included in the general sprinkler equipment contract, thereby obviating the chance of jurisdictional differences arising on buildings, since these jurisdictional differences, as applying to this class of work, are created because of the subdivisions of the contract

awarded in such work to plumbing and steam-fitting contractors, when in reality the work should be included in the general sprinkler contract, which belongs to the sprinkler fitter. Coöperation on your part in regard to retaining this underground work, or other work in connection with sprinkler contracts within the contract covering sprinkler installation, will aid us materially, and tend toward the successful and speedy completion of building operations and better and more satisfactory installations of fire-preventive devices."

The Chairman of the Institute Committee on Materials and Methods feels that this is a matter which might at least be called to the attention of the profession and given careful consideration by its members. If further detailed information is desired, and if the full discussion of the subject, as embodied in the complete circular letter sent out by the Association, is wanted, all can be obtained by writing to the office of the General President, 401 Bush Temple, Chicago, Ill. THOMAS NOLAN,

Chairman of Committee on Materials and Methods.

[EDITOR'S NOTE.—Without wishing to enter into any phase of a controversy between organizations of any kind, it would nevertheless appear to be advantageous to keep as much work as possible concerning any one installation under the control of any one contractor making that installation, thereby unifying instead of dividing the responsibility for the equipment and its successful operation.]

9K2 *Safeguarding Industry—A War-Time Necessity*

This is the title of a 24-page book prepared by the National Board of Fire Underwriters for the Council of National Defense, which is replete with practical suggestions for reducing fire-loss.

This book is described and quoted from with particular reference to conservation through the use of sprinklers by the Information Service Department of the National Automatic Sprinkler Association on page 20 of the Industrial Section.

9L Outgoing Pipes, Sewage Disposal and Public Health

As stated in the introductory paragraph to the Division 9D, the question of water-supply and distribution is similar in importance with the question of sewage disposal as concerns the public health.

No better introduction to this Division could be given than Mr. Ihlder's article printed under 9C1, to which the attention of the reader is directed.

1. The U. S. Bureau of Mines has issued:
   (*a*) Technical Paper No. 33, "Sanitation at Mining Villages in the Birmingham District, Ala.," Dwight E. Woodbridge. 1913. 26 pp. Contains illustrations and map.
   (*b*) Technical Paper No. 117, "Quantity of Gasoline Necessary to Produce Explosive Conditions in Sewers," G. A. Burrell and H. T. Boyd. 1916. 17 pp., diagrammatically illustrated. Price, 5 cents.
   (*c*) Miners' Circular No. 20, "How a Miner Can Avoid Some Dangerous Diseases," A. J. Lanza and J. H. White. 1916. 26 pp. Contains, among others, two illustrations, being front and rear drawings of a sanitary privy. Price, 5 cents.
   (*d*) Public Health Bulletin No. 68, "Safe Disposal of Human Excreta at Unsewered Homes," L. L. Lundsen, C. W. Stiles, and A. W. Freeman. 1915. 22 pp.
   (*e*) Bulletin No. 87, "Houses for Mining Towns," J. H. White. 1914. 64 pp. Contains a treatise on the subject of the small house in groups and as small towns. Includes a discussion of the town-site and enlargement of town with streets and alleys, types of houses, windows, doors, lighting, ventilation, screening, heating, interior and exterior finish, construction, the yard and its appurtenances, sources of water supply, disposal of wastes, sewer systems, substitutes for sewers, and other subjects of vital interest as affecting the public health. Illustrated with map of model mining town, plans, elevations and perspectives of houses, details of construction, and other data. Price, 15 cents.
2. See "Proceedings" of the American Society of Civil Engineers for lists of "Current Engineering Literature" on sanitation and other subjects covered by this issue.
3. See "Review of Current Technical Literature" and *Journal of the American Society of Mechanical Engineers* for information on these subjects. Also reports of committees in that Society on Flanges and on Standardization.
4. "Modern Methods of Sewage Disposal for Towns, Public Institutions, and Isolated Houses," G. E. Waring. 247 pp., illus. Contents include: Selection of Method of Disposal; Sewage Irrigation, Farming and Filtration; Chemical Treatment; Rights and Obligations of Riparian Owners; Disposal for Large Institutions, and Hotels; Disposal for Village and Country Houses.
5. "Sewerage and Land Drainage," G. E. Waring. Illus.
6. "How to Drain a House" (9G10), G. E. Waring.
7. "Guide to Sanitary Inspections," Wm. Paul Gerhard. 229 pp. Contents include: Essentials of a Healthful Home; Schedule for Sanitary Inspection of Tenement Houses; Inspection of Country Houses; Summer Boarding-Houses and Summer Resorts; Schedule for Sanitary Inspection of Schools, Hospitals, and Institutions; Sanitary Inspection of Dairies; Sanitary Surveys of Cities and Towns; Bibliography on Sanitary Surveys and Inspection.
8. See "Sanitation of Public Buildings"(9G4), Wm. Paul Gerhard, for sections relating to drainage systems and sewage disposal.
9. "Water Supply, Sewerage, and Plumbing of Modern City Buildings" (9G5), Wm. Paul Gerhard.
10. "The Sanitation, Water Supply and Sewage Disposal of Country Houses"(9G7), Wm. Paul Gerhard. Treats of the general sanitation of country houses and shows relation of the soil, the subsoil, surface drainage, sewage, etc., to a healthful home. The question of sewage disposal for houses not in reach of sewers is taken up, and latest developments in methods of disposal are given particular attention.
11. See "American Civil Engineers' Pocket Book" (9G22), M. Merriman, pp. 967—980: Section on "Sewerage Systems." See, also, section on "Sewage Disposal," pp. 980—997.
12. "The Separate System of Sewerage: Its Theory and Construction," C. Staley and G. S. Pierson. 324 pp., illus. Contents include: Plans, Specifications and Contract, Construction, House Drainage and Plumbing, Purification of Sewage by Application to the Soil.
13. "The Design, Construction and Maintenance of Sewage Disposal Works," Hugh P. Raikes. 429 pp., illus. A practical guide to modern methods of sewage purification.
14. "The Purification of Sewage," S. Barwise. 234 pp., illus. A brief account of the scientific principles of sewage purification and their practical application.
15. "Elements of Sanitary Engineering," M. Merriman. 250 pp., illus. Contents include: Sewage Systems; Disposal of Sewage, Refuse and Garbage; The Chicago Drainage Canal; British Commissions on Sewage Disposal.
16. "Practical Methods of Sewage Disposal," Henry N. Ogden and H. Burdett Cleveland. 132 pp., illus. Contents include: The Settling Tank; Valves, Siphons, and Siphon Chambers; Subsurface Irrigation; Sewage Filters; Broad Irrigation; Estimates of Cost.
17. "Sewer Design," H. N. Ogden. 248 pp., illus. Contents include: Preparatory Maps and Data; Estimating Future Population; Amount of Sewage per Capita; Ground-water Reaching Sewers; Sewer Diagrams; Plans and Cross-section.
18. "Sewer Construction," Henry N. Ogden. 335 pp., illus.
19. "Sewage Disposal," Leonard P. Kinnicutt, C. E. A. Winslow, and R. Winthrop Pratt. 435 pp., illus.
20. "Sewerage," A. Prescott Folwell. 506 pp., illus. The Designing, Construction, and Maintenance of Sewerage Systems, in three parts.
21. "Sewage Disposal," G. W. Fuller. 767 pp., illus. A comprehensive work with a comparison of values and data on methods, which includes a chapter on Institutional and Residential Plants.
22. For "Sewage Purification Plants for Small Country Residences and Isolated Buildings," see paper with this title by A. P. I. Cotterell, in the *Journal of the Royal Sanitary Institute*, June, 1916.
23. For recommendations as to "Sanitary Provisions for Medium-Sized Stations," see adopted Report of Committee on Buildings, Manual of the American Railway Engineering Association (1A9c), p. 218.
24. See "Sanitary Engineering of Buildings," Wm. Paul Gerhard, which contains Chapters on Sewerage of Buildings; Sewage Removal and Sewage Disposal; A Plea for Sanitation in Factories and Workshops; The Sanitary Drainage of Tenement Houses, and others as listed under 9G6.
25. "Mechanical Equipment of School Buildings" (9G8), H. L. Alt. Chapter XIII contains information on Sewage Disposal.

26. See "Architects' and Builders' Pocket Book" (9G9), F. E. Kidder, for information on Plumbing and Drainage, including reliable rules for same, and data regarding drains, sewers, etc.
27. "Architectural Hygiene and Sanitary Science as Applied to Buildings," R. F. and M. T. Fletcher. Illus. A textbook for architects, surveyors, engineers, and others, with many diagrams and figures.
28. See "A Guide to Sanitary House Inspection" or, "Hints and Helps Regarding the Choice of a Healthful House in City or Country," by Wm. Paul Gerhard.
29. See "Modern Sanitary Engineering:" Part 1, "House Drainage," Thomson Gilbert, for principles of drainage design, materials, gradients and other data as listed under 9G.
30. "Domestic Sanitation and Plumbing" (9G13), A. Herring-Shaw, contains sections on Soil, Waste and Vent Pipes; Sanitary Fittings; House Drainage; Cesspools; Disposal of House Sewage.
31. "I.C.S. Plumbers' and Fitters' Handbook" (9G23) contains a section on Drainage and Sewerage, which treats of Capacity of Circular Sewers; Sewer Pipe; Double Strength Sewer Pipe; Roof Leaders; Sewage Ejection; and Disposal of Sewage.
32. See Starbuck's "Drainage and Venting," Vol. I, 160 pp., illus.
33. Gillette's "Handbook of Cost Data," 1850 pp., contains information on the cost of Sewers.
34. "American Sewerage Practice," Leonard Metcalf and H. P. Eddy:
Vol. I, "Design of Sewers," 747 pp., illus.
Vol. II, "Construction of Sewers," 564 pp., illus., gives detailed descriptions of every step of trenching and the construction of pipe, masonry, and concrete sewers.
Vol. III, "Disposal of Sewage," 878 pp., illus., explains in simple language the nature of sewage and the changes that take place in it when it is subject to different conditions and describes the structures designed to produce these various conditions.
35. For descriptions and illustrations of reinforced concrete sewers installed by the city of Hartford, see Eighth Annual Report of the Department of Engineering, City of Hartford, Conn.
See Ninth Annual Report of same Department, concerning tile block sewers.
36. See "Water Pipe and Sewer Discharge Diagrams," T. C. Ekin, listed under 9D34.
37. The "Building Code" recommended by the N.B.F.U. (9G42) contains Section 257 on Plumbing and Drainage, which gives requirements to be followed in connection with the alteration or change of plumbing and drainage systems.
38. "Water Purification and Sewage Disposal," J. Tillmans. Translated by Hugh S. Taylor. 169 pp., illus. Embodies a critical survey of the work of the German authorities during the past few years in developing modern methods for the provision of suitable water-supplies and the adequate disposal of sewage, with a chapter on the disposal of industrial sewage.
39. See "What Our Cities Do Not Know," published 1915 by National Housing Association. Describes existing conditions in cities throughout the country as to vaults, privies, sewers, and general sanitation, with progress in legislation, law enforcement and improved dwellings, with a list of limited dividend companies in the United States and Canada which are seeking to improve wage-earners' dwellings in villages, together with a list of official commissions or departments and of volunteer housing associations or committees.
40. The National Housing Association issues many pamphlets, booklets, and other publications pertaining to all phases of housing, in many of which the subject of sanitary conditions is fully gone into. These are to be had at very nominal prices, and their study and distribution is to be encouraged.
41. For description of existing sanitary conditions, with summary and recommendations as to improving conditions in the city of Providence, R. I., and surrounding communities and some mill villages, and as applicable to many others, see "The Houses of Providence," John Ihlder and others, 1916.
42. See the "Annual Report of the Rockefeller Foundation," 1915, for information on "The Latrine Problem," pp. 60–65, as submitted in the Report of the Director General of the International Health Commission to the President of the Rockefeller Foundation from which the following is quoted.
"In what has already been done there is sufficient volume and variety of experience to afford a satisfactory basis for a critical study of the advantages and disadvantages or relative efficiency of the various methods employed for the disposal of sewage at the rural home. The state departments of health are eager to have this study made and offer coöperation in carrying it out; the Commission is prepared to coöperate by supplying the necessary funds for the work; working plans are being matured; the results of the many scientific studies that have been made of different phases of the problem are being summarized; and it is hoped that the investigation may be under way within the coming year. The work, if undertaken, will need to extend over a long period of time and to cover a considerable area of field work in order to test experience under all seasons and under a sufficient variety of conditions. The aim will be to subject present procedures to scientific examination with a view to pointing the way, if possible, to a method for the disposal of sewage at the country home that will be safe and that will be workable under prevailing conditions."
43. The U. S. Bureau of Standards has issued Technologic Paper No. 44, "Investigation of the Durability of Cement Drain Tile in Alkali Soils." 1915. 56 pp. Contains illustrations, tables and diagrams. Price 35 cents.
44. For information on "Vitrified Salt-Glazed Sewer Pipe," with dimensions, weight and cost, see "Lefax" Data Sheet 6-94.
45. For publications dealing with the make and use of especial kinds of pipes and sewers, see those referred to elsewhere as follows:
(*a*) Cast Iron Soil Pipe Makers Association (9B5).
(*b*) American Concrete Pipe Association (9B6).
(*c*) The Sewer Pipe Manufacturers' Association (9B7). This includes "House Drain Specifications" approved by the Association.
46. See Paper read at the 1917 Convention of the A.S.T.M., entitled "Distribution of Pressure through Earth Fills," A. T. Goldbeck.
47. Besides the Standard Specifications for Cast-Iron Pipe and Special Castings, mentioned under (9D41) the American Society for Testing Materials has issued:
(*a*) Standard Specifications for Drain Tile, Serial Designation C4–16, adopted 1914, revised 1916. These specifications cover three classes of drain tile, namely, Farm Drain Tile, Standard Drain Tile, and Extra-Quality Drain Tile, and apply to drain tile made of shale, fire-clays or surface clays, and to drain tile made of concrete. See reference to Report of Committee C–6 on Drain Tile.
(*b*) Standard Definitions of Terms Relating to Sewer Pipe, Serial Designation C8–15, adopted 1915.
(*c*) Report of Committee C–4 on Clay and Cement Sewer Pipe, 1916, presents, under the title Appendix 1, "Analytical Data for Sewer Pipe."
(*d*) In the report of the same committee, C–4, for 1917, the Committee presents the following, with a recommendation that these proposed standards be printed as tentative for one year before being presented to the Society for adoption:
Proposed Tentative Specifications for Clay Sewer Pipe.
Proposed Tentative Specifications for Cement-Concrete Sewer Pipe.
Proposed Revised Tentative Recommended Practice for Laying Sewer Pipe.
Proposed Tentative Specifications for Trench Pressures upon Sewer Pipe.
48. For further descriptive matter and illustrations pertaining to subjects covered by this heading, see the following pages in the Industrial Section:
(*a*) Crane Drainage Fittings, Crane Co., p. xix.
(*b*) Cast Iron Soil Pipe Mfgs. Asso., p. xxi.

Some Conventions, Meetings, and Expositions. September, October, 1917

Sept. 10–15.—The National Exposition of Safety and Sanitation, Grand Central Palace, New York City, under joint auspices of American Museum of Safety and National Safety Council.

Sept. 10–15.—New England Water Works Association, annual convention, Hartford, Conn.

Sept. 11–14.—The International Association of Municipal Electricians, annual convention, Niagara Falls.

Sept. 18–21.—Chamber of Commerce of the United States of America, special convention at Atlantic City.

Sept. 25–28.—American Foundrymen's Association, twelfth annual exhibit, foundry and machine shop equipment, Mechanics Building, Boston, Mass.

Sept. 27–28.—National Association of Brass Manufacturers, meeting at Milwaukee.

Oct. 7–11.—The National Paint, Oil and Varnish Association, convention, Congress Hotel, Chicago, Ill.

Oct. 15–17.—The National Housing Association, annual meeting, Chicago.

Oct. 26–27.—The American Iron and Steel Institute, annual meeting, Hotel Sinton, Cincinnati.

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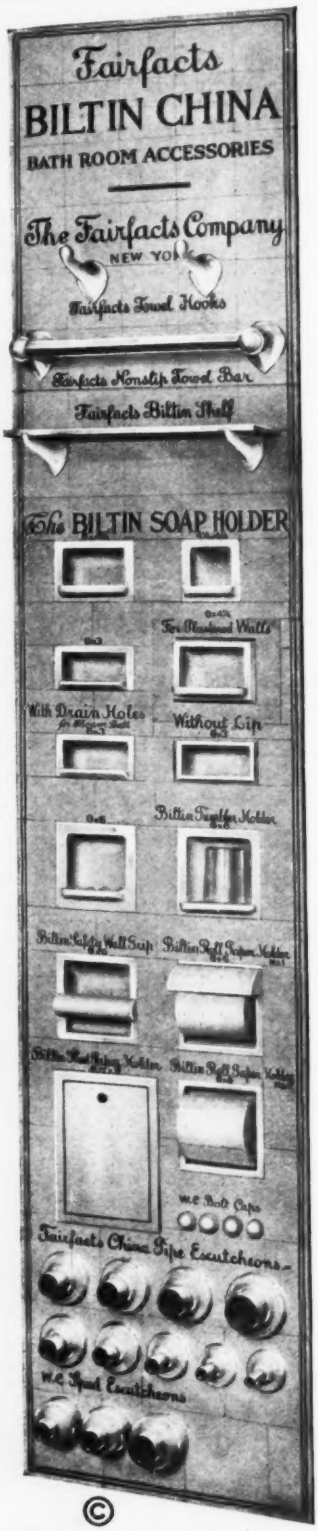

The New 1917 Model

of Biltin Patent

China Bathroom Accessories

THAT BUILD IN THE WALL WITHOUT SCREWS, ARE SHOWN HERE—THE DAY OF NICKEL-PLATED BATHROOM ACCESSORIES IS OVER

Snow white china Towel Hooks

Spotless non-slip Towel Bars, no more towels slipping

The finest, cleanest white Glass Shelf made

China Soap Holders—simply niches in the wall but made for all tile sizes and plaster walls too

The China Safety Wall Grip to keep you from slipping in the tub. A real ounce of prevention

Roll Toilet Paper Holders of china, for standard rolls and the No. 1 type rewinds the paper

A white coated metal recess sheet Paper Holder that is flush with the wall

White china Pipe Escutcheons

Pure White China	*versus*	Nickel Plate
Built in the wall	"	Screwed on
Recessed in the wall	"	Projecting from
Economy	"	Continual upkeep

Write for our specification sheet and catalogue

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